>The Unofficial
Android Manual For The Man

An introduction to **Android OS** with some of the most important and useful things about it.
Android is an operating system created by **Google** based on the **Linux kernel**.
There are different flavors of the **Android OS**, device manufacturer's versions, **AOSP**, **LineageOS**
This manual is suited for the newcomer noob and anyone else including the Android hacker.

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Written by Chob and Artemis (шооьака ат зепӀратьаи дот орг)
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ArtifexTerra, fant0men, SlammerHedge…
The free internet platforms,
The Open Source Software devs and maintainners,
Анд мӀ шӀни метал ьут.

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(Ubuntu user? Have a look at **«The Unofficial Ubuntu Manual For The Man»**)

Android V 5, 7, 12 and beyond ...

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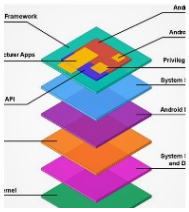
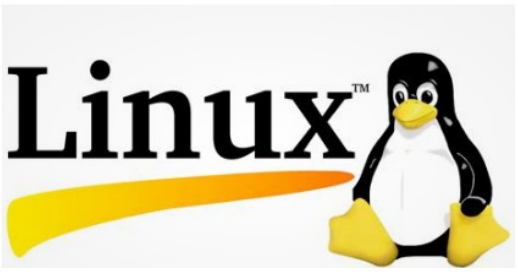
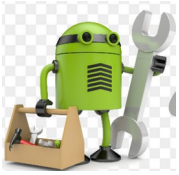
01-Overview

Overview of the Android Operating System



Android is an **open source operating system** designed by **Google** based on the **Linux kernel**, for mobile devices (tablets / phones or netbooks), The **Android Open Source Project (AOSP)**, designed for touchscreen devices primarly, but do support keyboards / mouses / gamepads and many things via Bluetooth (wireless) or USB (with an OTG adapter usualy).





Technical:

There is no need for drivers or any configuration, it is ready to use out of the box and usually the device is not meant to be modified at the hardware level (that is you do not change a component, graphic chip, or add memory etc, to a mobile device usualy, as opposed to old time PCs / gaming / personnalised / modded hardware), that is only manufacturers of smarphones and tablets or netbooks. There is a modded version of the Android OS called **Lineage OS**, based on AOSP with modifications to work on many devices (by flashing the internal chip - hacking - void warranty) including the **rapsberry PI computer boards**.

(Hardware SoCs : Mediatek/Qualcomm/AllWinner/Broadcom ... with integrated video decoders and GPU like Mali, PowerVR, Adreno or others..

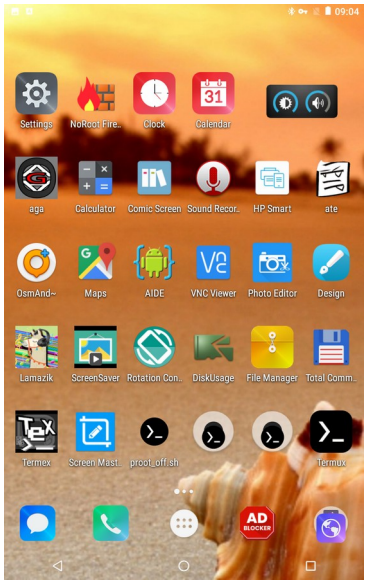
Lineage OS is an **Android OS** based on **AOSP** from **Google**, but without the **Google-apps (google-playstore/maps/calendar)**, and few added functionalities and mods.

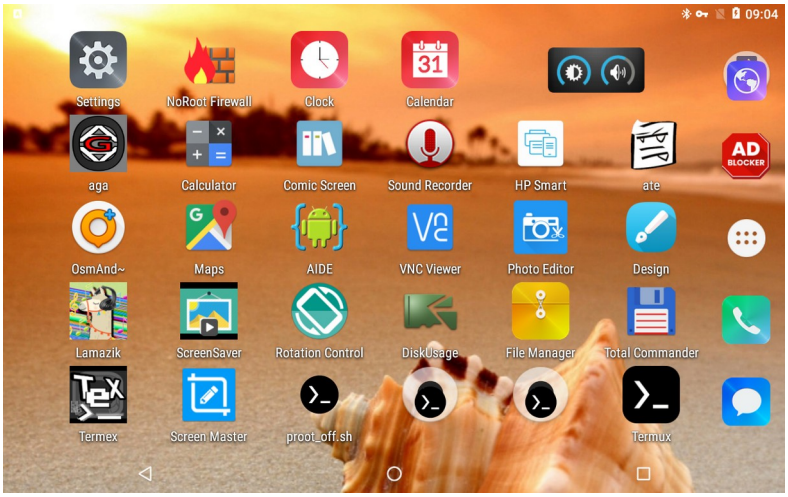
Note: You don't necessarly need a Google account to use the Android operating system, same for Lineage OS.
You can use an Android OS or Lineage OS without any e-mail account and without having to be connected to the network (offline systems).

Android devices usualy offers multitouch screen, SDcard support, WIFI, Bluetooth, satellite positionning-map capabilities, 3G/4G/5G mobile internet connectivity, sensors like compass, accelerometers, and so on, USB plug (with OTG to plug a USB stick or an adapter for wired gamepad/audio/network),
[integrated hardware video decoders and OpenGL-ES 3D support]
with no need for modifications or configurations.

Starting the Android OS:

When you start the Android OS you will see the desktop, called the 'launcher', with icons (like Windows/Mac/Linux) and you can tap an icon with your finger to launch the 'app' (application/program).
For instance, you tap the clock, and it will open the clock app to check alarms and things. The Android OS itself comes with preinstalled apps usually (clock / calendar / file explorer / sound recorder / calculator / etc...)
and theses ones cannot be removed.
Manufacturers will have other apps on top of it, that you can't remove either.
When you rotate your device in portrait or landscape mode, the screen can autorotate, though sometimes you need to allow it to do that first.
(some phones will stay in portrait-mode at the launcher icon screen)

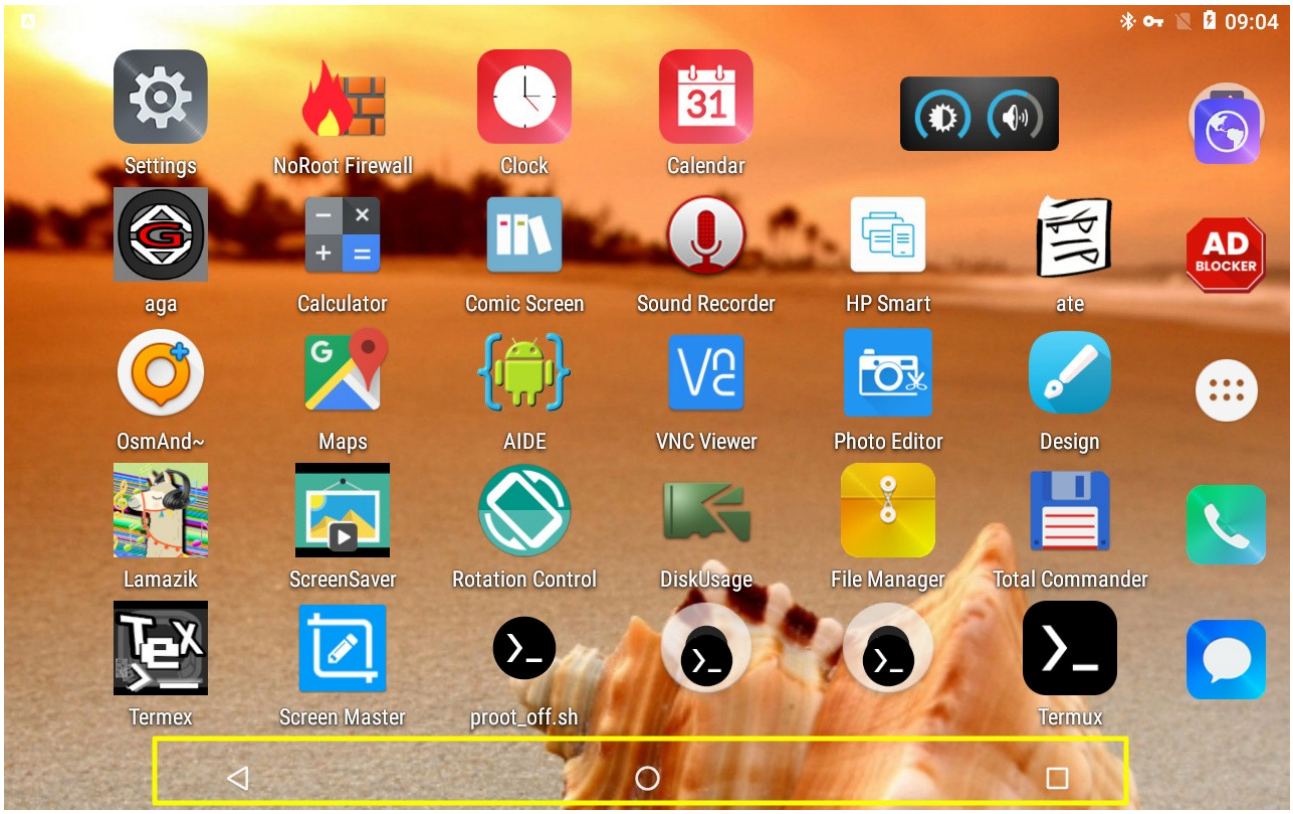




You will usualy find the 'phone' icon as well as the messages (text/sms/mms) or 'contacts' icon that can store your contact list (on smartphones at least, cause it can be a bit different on tablets or netbooks)

Down the screen, there is 3 special icons separated from the others,

(inside the yellow square here)



'left-arrow/triangle', 'circle' and 'square':

'left-arrow/triangle' : this one is meant to 'go-back', ex: if you tapped the clock, now you tap the left-arrow, and you will get back one level before (at the desktop or the clock-screen just before).

'circle' : this one is home-screen, desktop icon, anytime you tap it and you get at the launcher/home desktop start screen with icons.

'square' : this one is meant to switch between the running apps, like 'alt-tab', or to see the app list.

This is the basic behavior of theses buttons, though they can change a bit, just like the launcher itself can be configured or modded.
note: if you long press the square, you can run apps in split screen (2 apps running on one screen) Because normaly Android is meant to run only one visible app at one time on the screen. Some versions of Android may have a 'Windows' mode that enable users to have floating 'Windows' (like on PC) but we won't talk about it.

Now, if you slide your finger from the top of the screen down a little, it will slide-down-open the notification panel, in this panel any notification will pops up as a message line,
(ex: "File XYZ successfuly downloaded", "3 updates available" ...)
you can touch a notification line and slide it away to the right to get rid of it, or if you slide them all down or up, there must be a "clear" button, and tapping it, will clear all notifications at once.
(see picture next page)

Slide down from the top to open notification panel

Note that on Android you may not have a scrollbar on the right like it is the case on computers with long text that don't fit the screen and it can be the case for large pictures also (or icons boxes and widgets), so you keep your finger pressed on the screen and you slide up or down to see if the picture is larger or to read the next part of the text.
Scrolling the text up or down or left or right to read the next part.

Some applications have a 2-fingers-zoom capabilitiy, you take a photo or open a picture, and when displaying the photo you can tap your 2 fingers at the same time on screen and approch them one to the other(pinch) to zoom inside the picture, or get them away (the opposite move) one from the other, to zoom out.

Most Android devices are multitouch 5 or 10 positions can be detected at one time. (see 'Accessiblity' chapter for copy/paste and a bit more)

If you slide down a bit more the notification panel from the very top, it will display the system-icons, the system icons allows you to enable or disable system options on your Android device:
(You can also slide it down twice that would display more icons)
enable/disable WIFI or connect to a wifi hotspot, enable/disable bluetooth to connect a wireless keyboard or headset etc, make a screenshot (if available), enable flashlight, rotate screen, etc.
(see picture in the next page)

Slide again from top of the screen to see system icons.
(or tap the down arrow if you have one on the side)

Tapping a system icon will enable or disable the function, like a toggler, ex: the flashlight: tap it once, activate the flashlight (see behind the device) and tap it again to turn it off. (usefull on smartphones at night sometimes).

If you **long press** the WIFI icon for example it will open the setting panel at the WIFI section for more control instead of turning it on or off.

Advanced:
  Theses system-options icons can be configured also, try to slide them on the right and see if there is an "EDIT" button, since only the main ones are setten-up usualy.

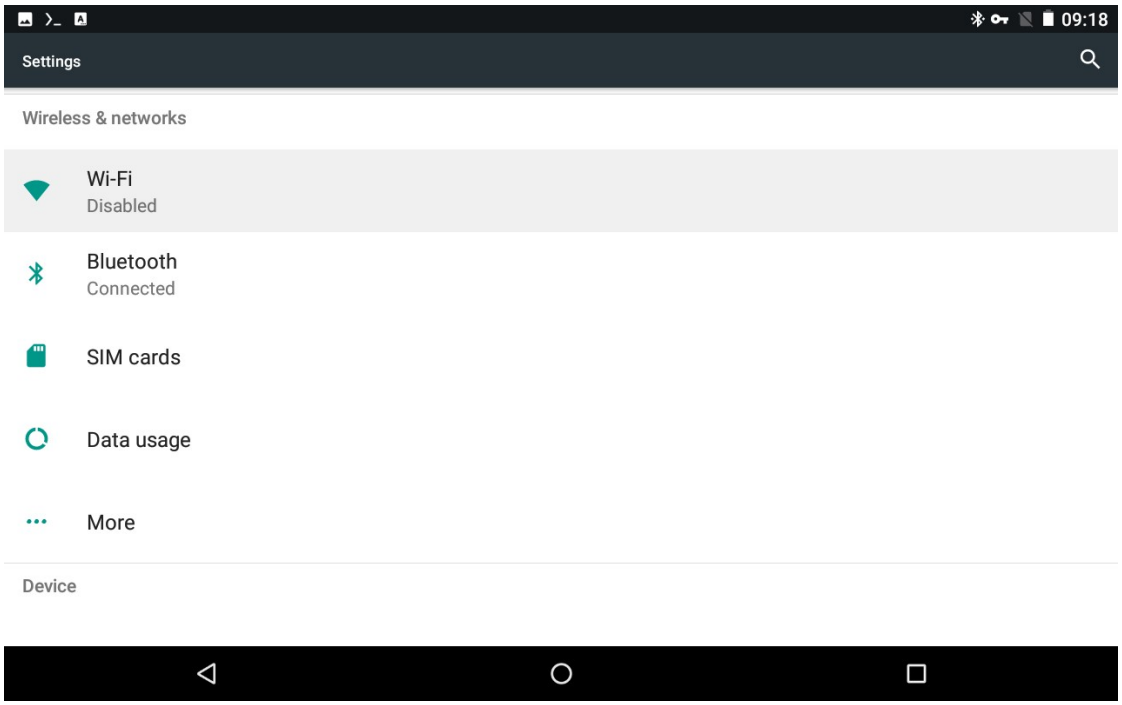
In that same panel, you must be able to **change screen brightness level** or other things, **sound level** is usualy changed only via **the devices' physical buttons**, thought you will see that you can add a **screen widget** or other things later.

The **Android topbar** that stay visible or not when on desktop launcher or inside a running app, usualy **displays time and battery on the right**, few icons to tell if your connection is secured, and **WIFI status** on the left.
(see picture on next page)

The Android top bar with status, battery, time

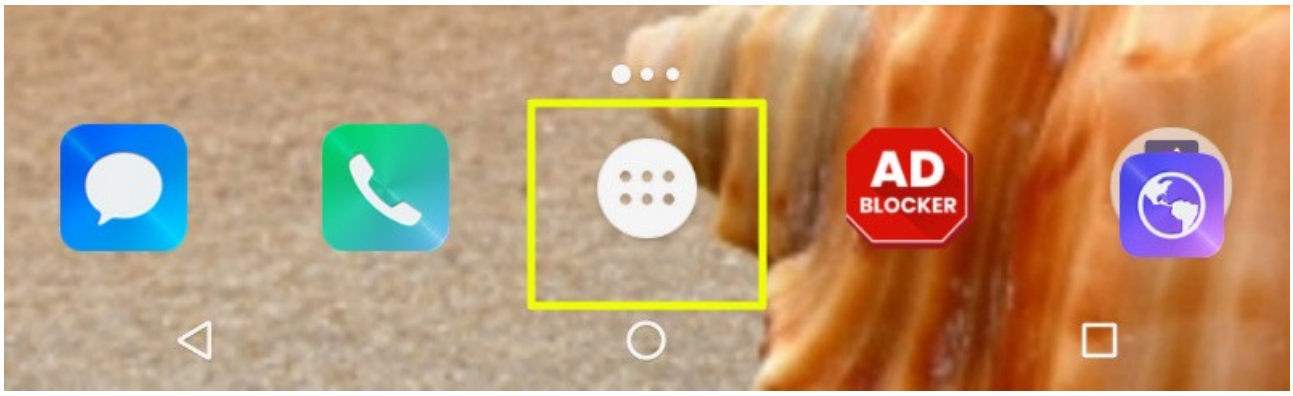
Back to the **home desktop launcher**'s icons a little, so there is the few icons of apps shipped with Android out of the box, clock, calculator or others, and the important one regarding the system is: **SETTINGS**
(with a gear icon usually, the icon on the very left in the previous picture)
(more detail about settings in the next chapter)

Now, if you tap the **setting gear icon**, you will get onto the main **settings screen**, where you can configure everything and anything about your device, set date/time, change language, theme the interface, or set Wifi hotspot, display, accessibility, and everything.



The settings screen, the Android topbar remains visible and the 3 main icons in the bottom, but it may not be the case with some apps

Back at the home screen, usually you will have another important, icon down the center of the screen is a **grid-dot app icon (app drawer)**,

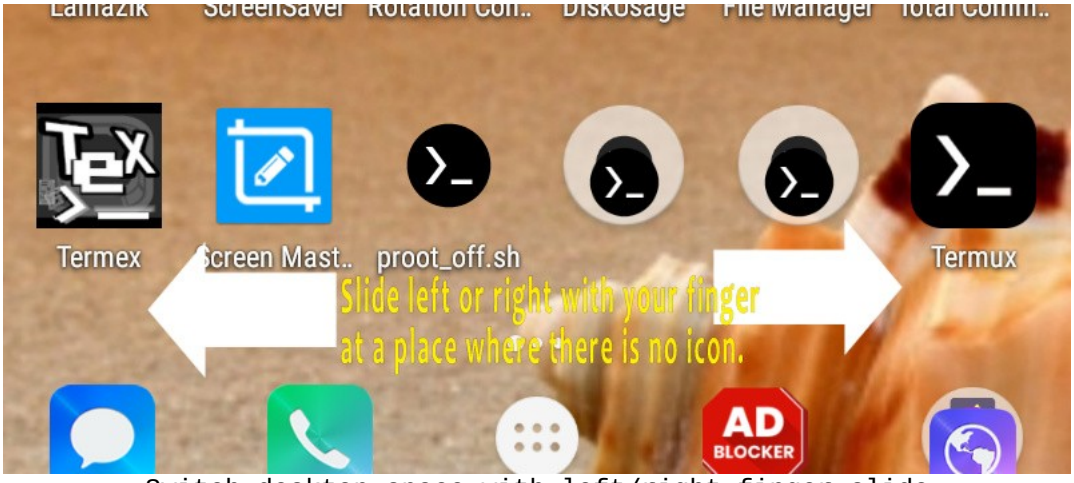


And this icon should open the full app list, that is the list of *all* applications on the device, default ones or new ones that you installed will be listed in here (scrollable list, but this can differ with some Android versions or manufacturers). Sometimes this button is not available with your launchers(manufacturer's choice) then you can choose another launcher app if you want it.

Because not all applications icons would fit on the screen of course. Only the important ones that you want on your home desktop. Now back at the home desktop screen, if you keep pressed on the desktop with a finger and slide on the right side, you can get another empty desktop space, to drop application's icons, and slide left, the other way around and you're back at the main home launcher screen.

The 3 other dots here on top of the yellow-markup displays the number of virtual screens available/configured, here i have 3 'desktops' with differents icons shortcuts placed onto them, and i slide left/right where there is no icons with the finger to swap between them.

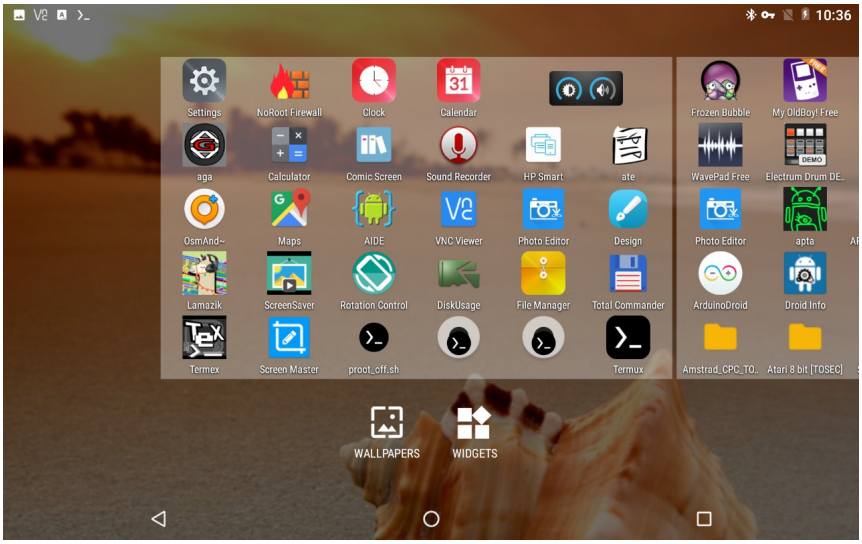
If it doesn't work it is because you need to push icon shortcuts there first, now to do that, tap the grid-dot app icon, then keep pressed an icon (an app, like the calculator) and move it with your finger, keeping it pressed, and release it on the screen somewhere (or to the left edge of the screen to change desktop before releasing it), that is drag'n'drop icons from the app list to the desktop.



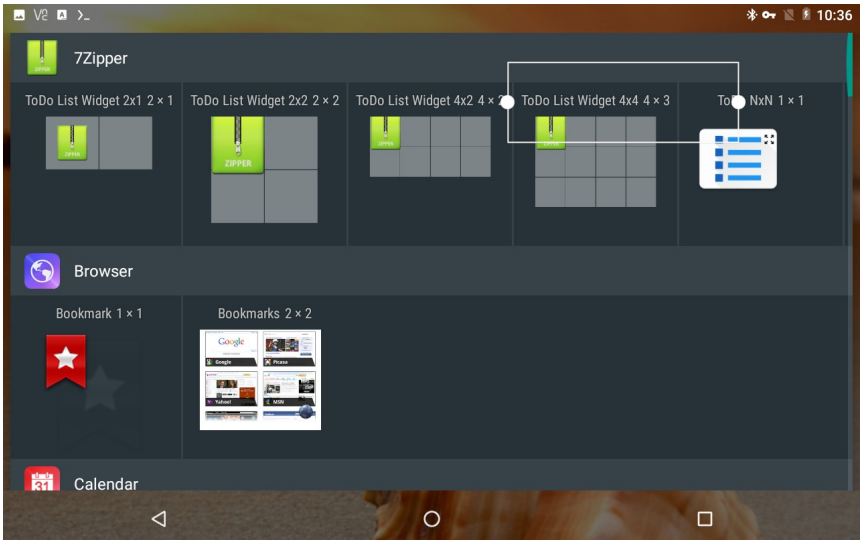
Switch desktop space with left/right finger slide

Some manufacturers have tweaked versions of the Android launcher, out of the box, like some Xiaomi devices, you slide from left ot right on the launcher, and you will see a newsfeed and weather or other preconfigured things.

The widgets: Onto your android desktop, you can put '**widgets**' that is tiny app-gadgets that remains on screen, ex: a large analog-sticks clock, something to tell the actual weather, or a todo list, etc. To do that keep pressed with your finger on the desktop on an empty space and tap 'WIDGETS' when it appears, then it will show a list of widgets you can use on your desktop.



Long press on a place with no icons let you choose **wallpapers** or **widgets** option

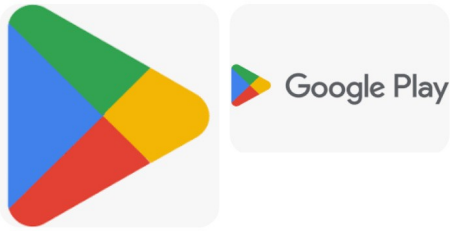


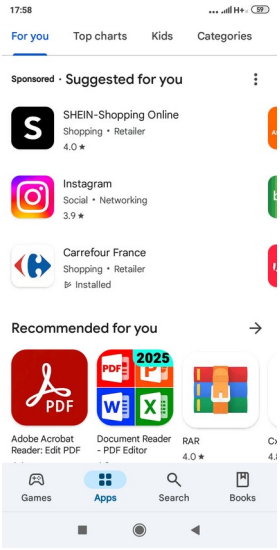
When you choose **widgets** you will have **the widget list** and you can scroll it down

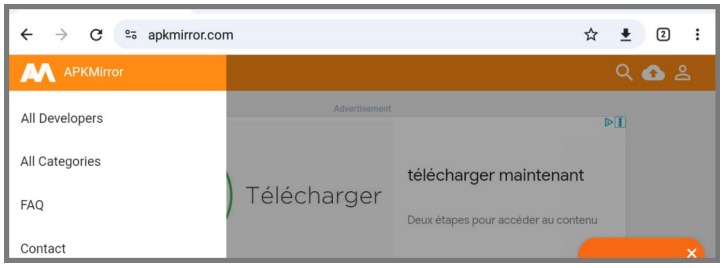
Here is a widget for sound/brightness control with floating slider window

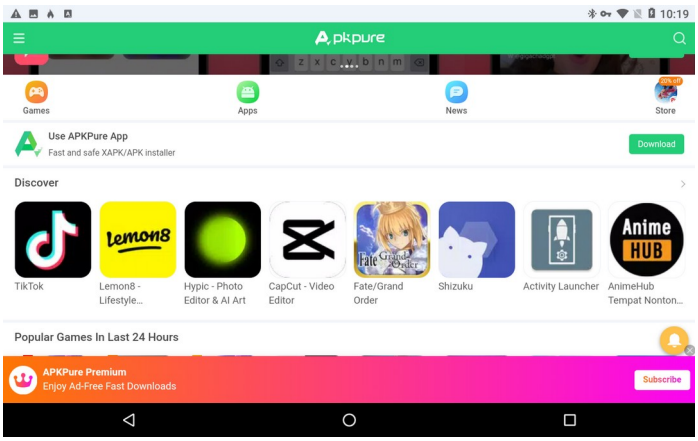
With Android you can install any app/program, another calculator, a text editor, a game, a book reader, a map program.. and sometimes some of theses apps can provide a widget too as well (some other apps are meant especially for widgets (volume icon shortcut etc)).

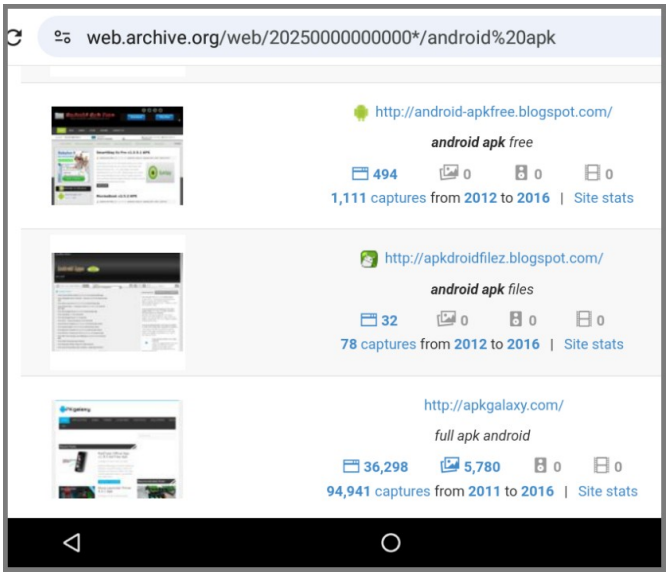
To **install an app** usually you use the **Google Playstore**, and you can search for an app and install it. Though some manufacturers may have there own app store on top of it. You can also install apps manually they are called **APK .apk files**, and they are also archived on **websites** like **apkpure.com** or **apkmirror.com** or **f-droid.org** (open source apps)
or even **archives.org** sometimes
or other apk resources.
(hackers: note that some apps can be incompatible sometimes,
because of hardware but more often because of older Android versions.
x86/x86_64/ARM/ARM64)





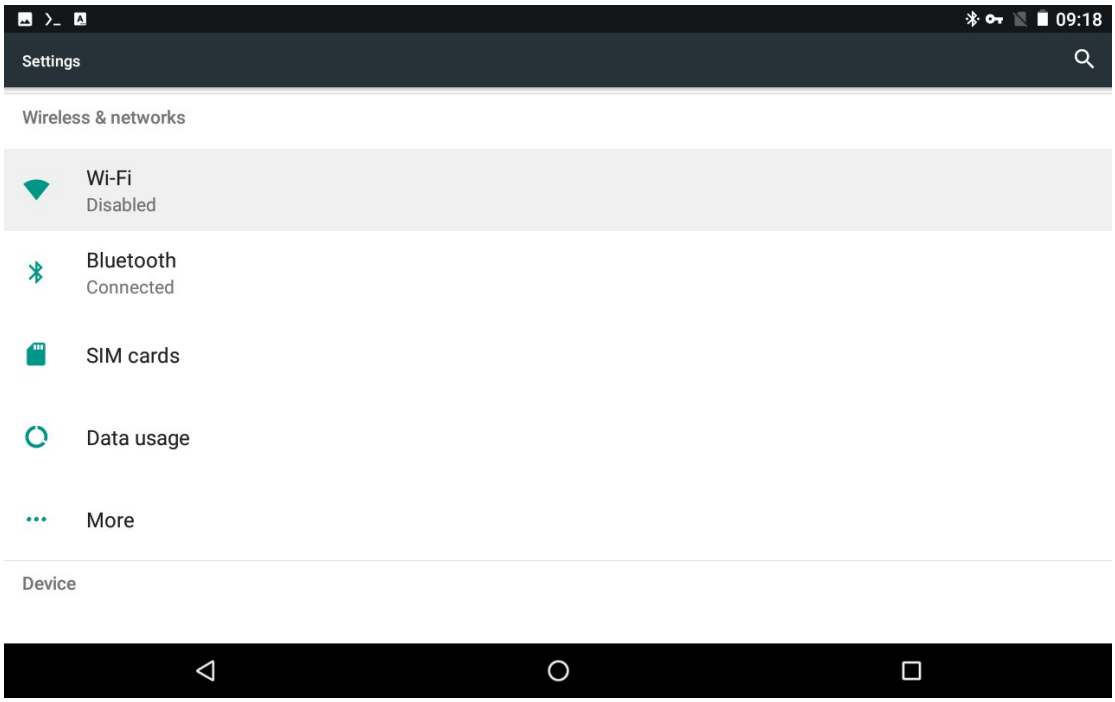




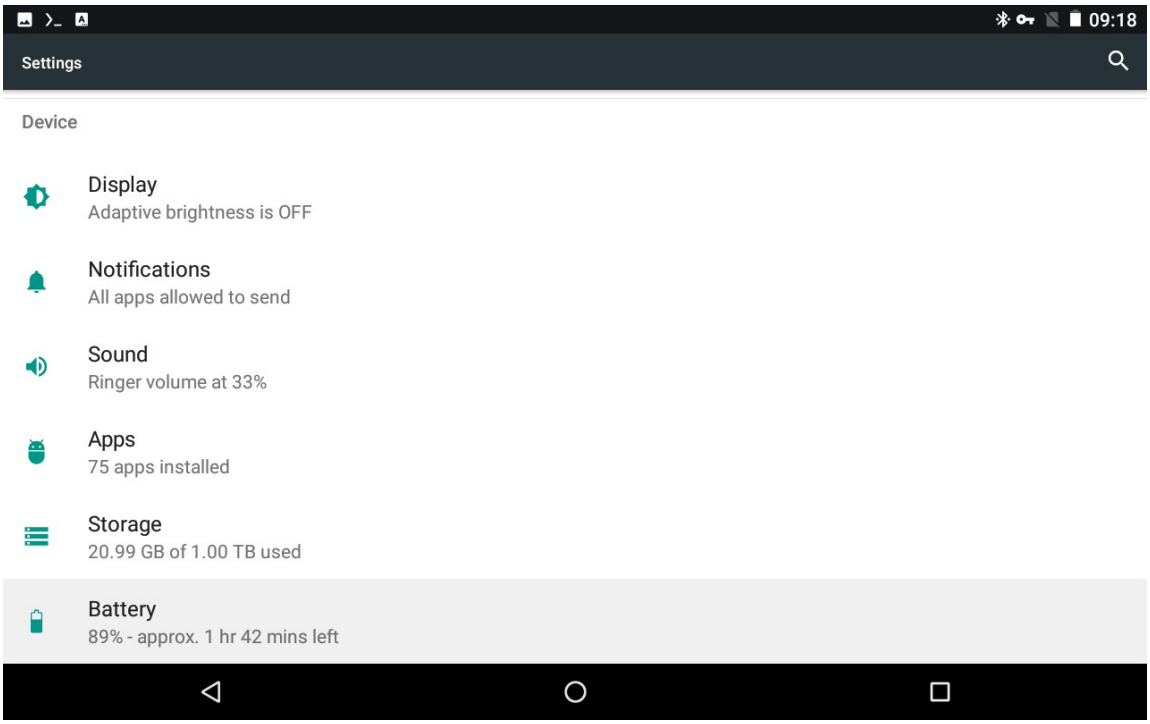


02-Settings

When you tap the gear icon 'Settings' it will open the setting configuration screen, with all the possible options that you can modify or turn on or off. Usually on top there will be a search bar, to search the options, then WIFI, bluetooth, mobile then display, sounds, apps, and more.



In the WIFI section you can configure the network to connect to, the password, etc. It is usually self describing and quite intuitive,

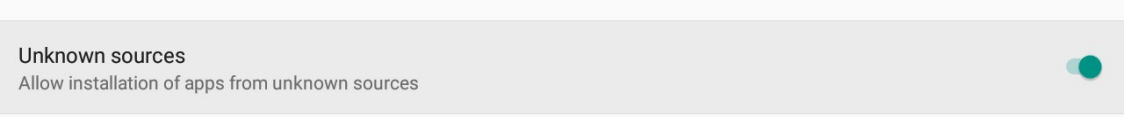


Now few examples and /the option search bar/ :

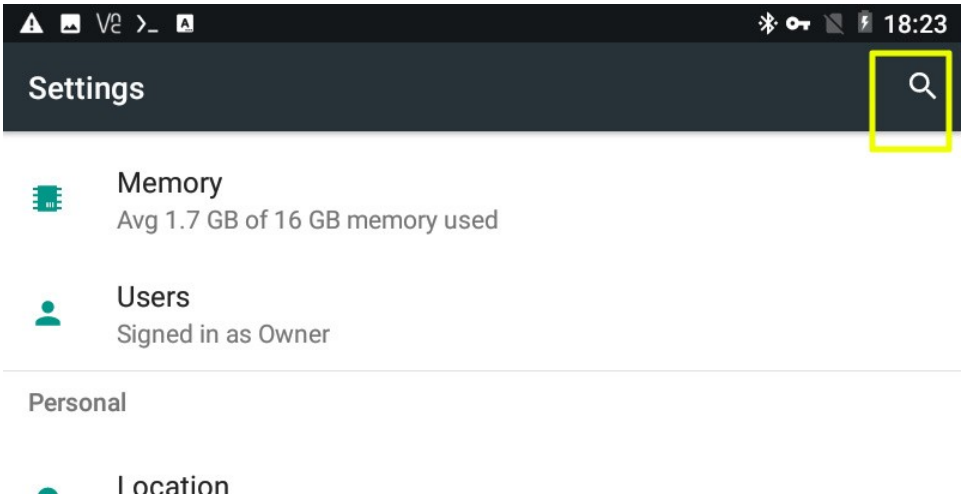
In the settings, you will find the 'Security', 'Account', 'Storage', etc,

In the 'Account' section you can configure your Google account of course, password, synchro with the google-cloud-network and more. In the 'Storage' section, you will see the information about the current storage of your device (integrated) the SD card if you added one inside it, or eventually a USB stick or hard drive if you connected an external drive. Now in this place you can 'mount' or 'dismount' the storage: a 'dismounted' storage means that it is still connected to the device but not accessible, and normaly when removing a storage it needs to be dismounted (see the notification), sometimes Android needs to format the storage SD card or USB stick if it's new or if it's not the correct format, it is fesable in that place also.

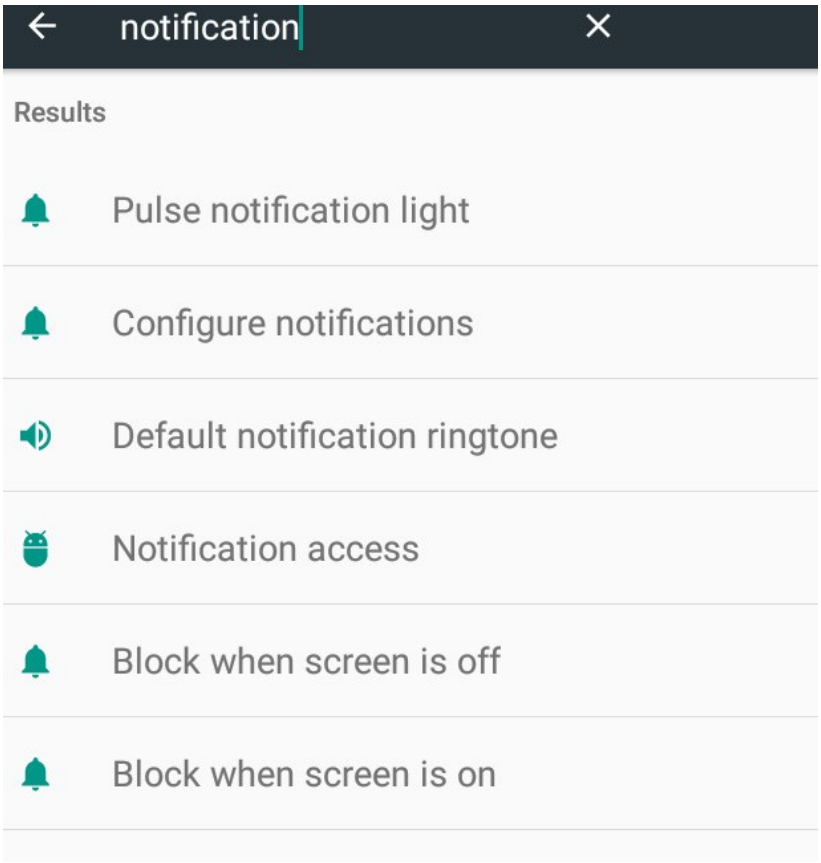
Another example of interesting settings:
In the 'Security' section you should find the 'Unknown Sources' switch, that allows you to install apps from .apk files manually rather than using the google-playstore (default install method), so you can turn
that on or off, if you need to install a particular app manually, for instance an app that would not be in the Playstore like Termux.



Another example, you should also find the option to display the notifications when the device is locked...on or off, and if it's not there it can be in another section, and because there is so much options: on the first Settings screen on top, there is a **search bar** or a **magnifying tool icon**, then tap it and write 'notification' and you will see all the configuration options related to 'notification', maybe configure the sound when a new notification
pops in and so on. (see next 2 pictures)



'Magnify' search icon on the top right



Notifications related parameters

About Storage settings, it may ask you to format it when you insert an USB stick or an SD card, and sometimes there are files on the storage but Android cannot read it OR it is ‘broken’ and needs to be scanned/repaired on a computer. Be sure about what you are trying to access that it IS compatible.

WARNING: if you format an SDcard or a USB storage, all data on it is lost.

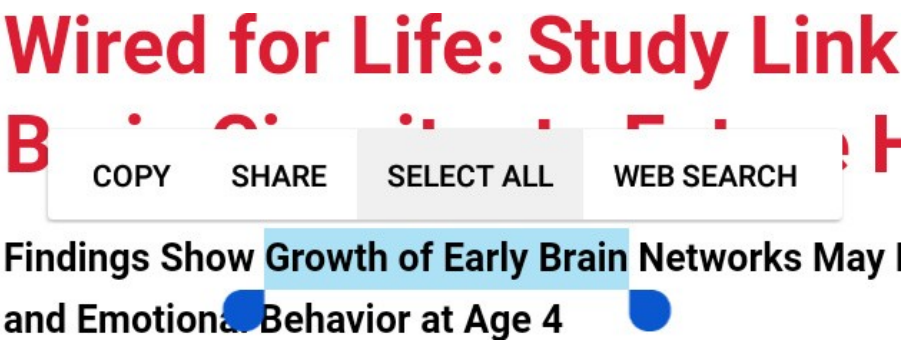
We'll see later a bit more about advanced settings or other things.
Now, still in the first setting screen there is the '**Accessibility**' entry.

03-Accessibility

Inside the **Settings** you will find **'Accessibility'**, with usefull features, like "**high contrast**", "**Large mouse pointer**" if you prefer to use a mouse and keyboard, "**Color invert**", black on white is better seen in daylight. And other settings like that, that can be turned on or off.
There is also support for text to speech, the digital voice can speak text loudly when the text is selected for example.

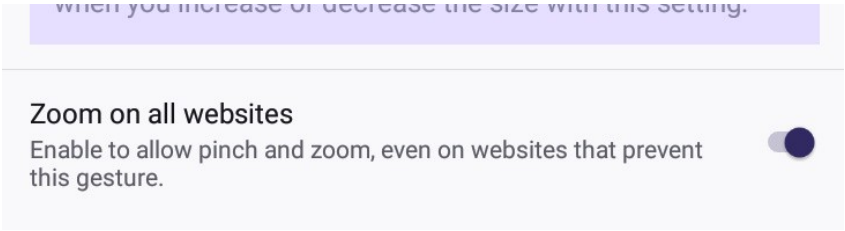
With Android you can use a **digital assistant A.I.**, and speak to it like a real person (like '**Hey google, set an alarm clock at 8 p.m.**'),
the official one from Google, or others from third parties applications from the store, but we won't talk about that in this manual.
(Search for '**Android AI digital assistants**' online for more informations.)

As said before, there is some applications that support the 2 fingers gesture to zoom in or out inside pictures or text.
In most applications you **select text** by keeping your finger 1 second onto the text/word until it gets colored, then a popup-message should appear next to it with '**select all**' that let you select all text at once
if you tap it, otherwise you can **slide-move the bracket left or right** and **down or up** to adjust the part you want to select, then you can copy it (like a copy/paste on a computer), and with the mouse-



-It can work about the same, though **ctrl+c** and **ctrl+v** should also work.
But if using a keyboard with text apps you can also zoom in/out with keyboard shortcuts like **ctrl+shift+plus (+) ctrl+shift+minus(-)**
or with **alt** key, depending of the apps.
(in the web browsers, or in textnote applications, or Termux etc)
(see shortcuts section of the manual)

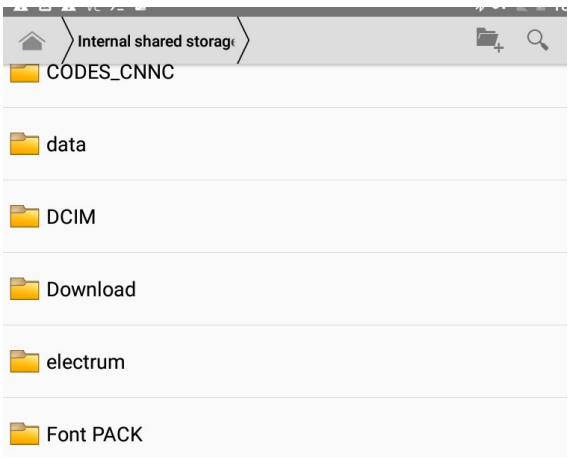
In the web-browser you may need to 'force' that feature in the settings of the browser (accessibility section or other places) to allow zooming on all websites. It can be the same for PDF readers and other apps.



04-Files: the file-system

The files on Android:
  On your device integrated storage there are folders like:
    "Download/", "Android/", "DCIM/", "Music/", "Pictures/", etc

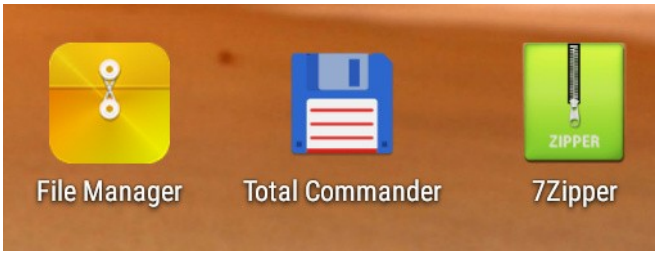
That is the folders you have access, for instance if you take a photo, the photo will be saved into the folder **"DCIM/Camera/"** because **"DCIM/"** is a convention-name that you cannot change, it stands for digital-camera-... something, but it is the same for the folder **"Download/"**, if you download a file from the internet it will be stored in that folder, and you have access to it.



Now, for security reason and guarantees to manufacturers and app developers, the **system-files** of Android are not accessible, exactly like on the playstation consoles they don't want cheaters to modify their official apps while it's running or mess around with the internal settings of the Android OS, but the folder **"Android/"** is accessible with the personnalisation settings for apps and more, and it is possible to backup things.

Now **hackers** can sometimes **'root' the device** which means they have **'admin' access right** down to the kernel of the OS or do other things that are normaly not possible, however in that case the device is 'marked' as **unlocked** and **rooted**, and apps may refuse to function normaly. It is also discouraged because there is the risk of breaking the device (**'bricking'** it with a **dead black screen** with **no recovery possible**) and it will **void the warranty** of course.
(see Raspberry PI for more Android hacking)

The default app to see your personal files and folder is usualy an icon that looks like a yellow folder named "**File Manager**" or "**Files**", but there are other good ones like "**Total-commander**", recommanded with plugin to extends its functionnalities or "**Ghost-commander**" an open source one that is very similar, and you can install them from the **Google-play-store** or **F-droid**.



The filesystem is a bit like Linux but we won't go into details here. When you install an app, the app may create more folders next to **"Download/"** and the others, and inside the **"Android/"** folder as well with its particular app-data, that you don't have to touch.
A folder that starts with a dot **'.xvf034/'** is usualy configuration
(that is the case on Linux too).

Many Android apps may scan your folders to display thumbnails of you photos, or list the names of songs etc, and because there can be icon files or many config things that should **NOT** be scanned you may see a file named **'.nomedia'** in a folder, when this file is here, it means the folders will be ignored by apps,
example: **"IconList/.nomedia"**
Means that the folder **"IconList"** will be ignored by the apps, whatever there can be inside (pictures, musics or other folders)
And you can create a **".nomedia"** file in your own folders if you want.
(ignore means that it is hidden from the apps)

If you stick an SD card inside the device it will be accessible as a second storage and you can choose if apps should use it or if you just want to store your own files. Same for a USB Stick or hard drive, weither it is with on OTG adapter on the charging plug or on a real USB plug or USB HUB.
SDcards or external storages (if formated by Android) will have names like **"3345-2C3D/"** or the drive name **"SANDISK/"**, but you can rename it.

If Android cannot read your SD card then it will ask to format it, in the Android file system (normaly exfat but it could change), but be sure it is readable by Android or Linux or Windows first, and that the USB storage is not broken or messed up.
WARNING: it will erase all the data on it if you format it.
Advanced: use a compatible disk format that Android can read like FAT32 VFAT EXT3 or EXT4 or others.
You may want to use FAT32 that can be read on Windows PC or other platforms for compatibility.

Sometimes you may have to give the app the permission to access external storage, then just go on and choose the drive if Android ask you.

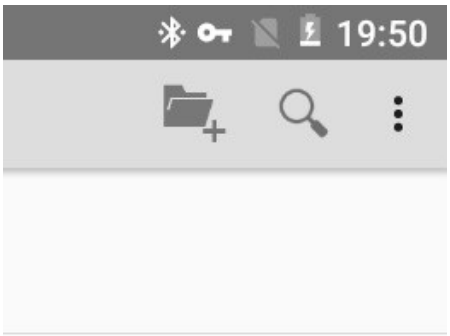
If Android cannot read your SD or USB stick, try to fix it on a computer first with a **check disk** or other tool, using a **Linux USB boot stick**.

If android cannot read, it will assume it is broken and ask to format it. because it is user-mode-only there is no access to the hardware or other low-level tools to do that.

A disk repair on a computer or...for power user on a device with admin/root access Linux, Windows, Mac or others. With a preference for linux, better hardware access and repair tools (USB BOOT Stick).

05-Find your files

On the default **file explorer** or **Total-commander**, you will usualy start at the base of the file system for the user, that is
the place with the "Download/", "DCIM/" folders etc, in that same area
you can create a new fodler next to them, says **"MyPDF/"** and store your PDF documents into that one, rather than in **"Download/"** and how to do that depends of the file explorer, but you will find at the top corner of the screen left or right, a dotted icon or menu icon and touching and looking around
a "create new folder".



Normaly, if you long press a folder or file in the list, it would display a popup menu, with "cut","copy" or "properties" and so on.
(but it can be using the 3 dots-icon on the top right corner)
And again in the corners or topbar or bottombar an icon to sort the files by "modification date"("date") instead of "name" or by "extension".

On **Total-commander**, if you slide your finger to the left/right (like changing desktop-space) you can get to the second screen, and that enables you to copy/paste from screen1 to screen2,
Ex: **long press a folder** inside the list, then **tap "copy"** now **slide to screen 2**, by sliding your finger to the right (or tap the screen-change arrow icon) and **long press on it**(or on the '..' or another folder), then **"paste"**.
(the 2 total-commander screens left/right can represent the same place/storage or: screen1 = internal-storage, and screen2 = USB-storage, or SD-card etc)

06-Save and read files on external drives (USB sticks and hard drives)

On Android devices you can normaly add an SD card inside of it, and/or connect a USB stick or USB hard drive via the charging plug (with an OTG-adapter: USB type-C male <> USB female).
For some hard drives tho you need a separate power supply, or you should be able to use it with a self-powered-USB HUB as well.

If Android cannot read your USB stick or HDD it could means the file system is not compatible (suggested to use Android FS of FAT32 file system for compatibility) or that the drive is not readable.

Now, if you want to **backup your files** on your **USB stick**,
Connect your USB stick with an OTG-adapter on your device,
open the file explorer like **Total-commander** and just
copy your **"Download/"** folder to the **USB stick** for example.
Once done, check the notifications in the top bar by sliding your finger from the top, and **tap 'Eject'** to dismount the USB stick, then after that you can unplug it.

Note that, if for some reason your screen is broken or the device stops to work then you will not be able to access your files anymore, so **if it is saved onto your USB stick, you still have them on the USB stick**.
Same for the **SD card inside the device**, it the device dies, you remove the SD card from the dead device, and insert it into your new device, so **you don't loose your data.**

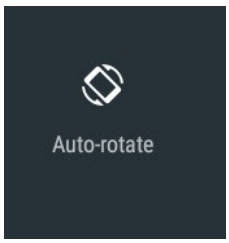
Now, many people like to use the **cloud storage** of Google-cloud or other solutions/providers because it's **all online and handful**, But **beware** that your **data may be stored in other countries**, and also if the website/company shutdown or in case of censoring **it may be scanned / unaccessable / removed or blocked**.

 # Sanctions to other countries / war / unexpected reasons (policy change)
  *** internet behavior subject to change,**
  *** your data might disappear, not accessible anymore,**
  *** cannot connect (unreachable)**
  *** eventually account suspended with no explanation ! !**

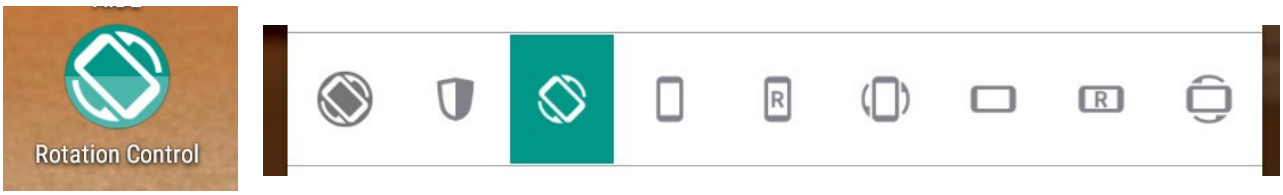
07-Controlling and forcing rotation of the screen

Sometimes you want to **force your screen** in **landscape mode** as opposed to **portrait**, or the other way around, for a game/movie, to read a file like a book.

If you slide on top to see the notifications and the system icons, you will see **'auto-rotate'** and if you **tap it you can force it to landscape or portrait**, and tap it again to change, no matter how you rotate the device it will stay with a landscape mode.



Not all Android versions have that option in the icons then in that case you can **install a separate application** like **'Rotation Control'**, then you start the app, and it will **let you force the current mode landscape/portrait** and will add some icons into the notification panel on top.



Icon and notification bar of ‘Rotation Control’ app

08-Using multiple languages, switching keyboard languages, accentuated keys

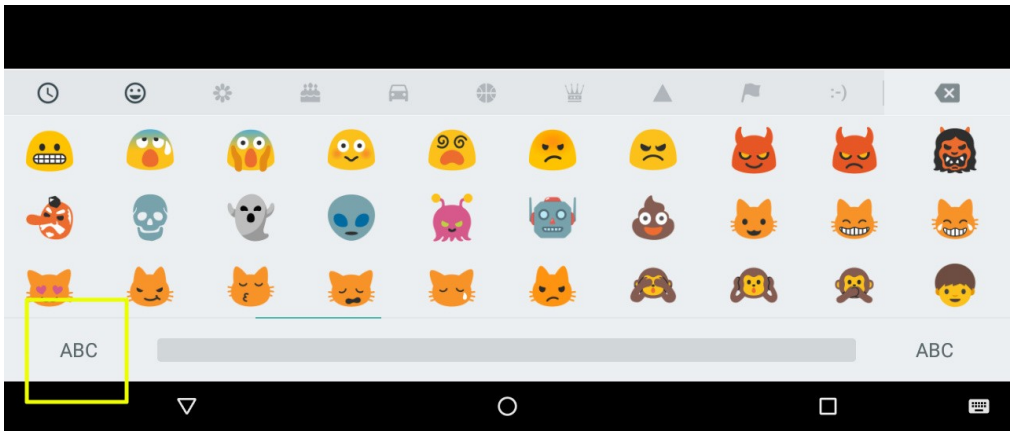
Sometimes you need to **use multiple languages**, however the android keyboard onscreen displays one language of course.
You first need to activate the desired languages into the settings, tap the **settings gear icon**, then '**Language & input**' then '**Virtual keyboard**' then '**Android Keyboard**' then '**Languages**', now you can use '**System languages**' or..select particular langages just for the Android keyboard.

If you choose '**system languages**' you will have access to the languages activated one level before, in: '**language & input**' then '**Languages**'
Ok.

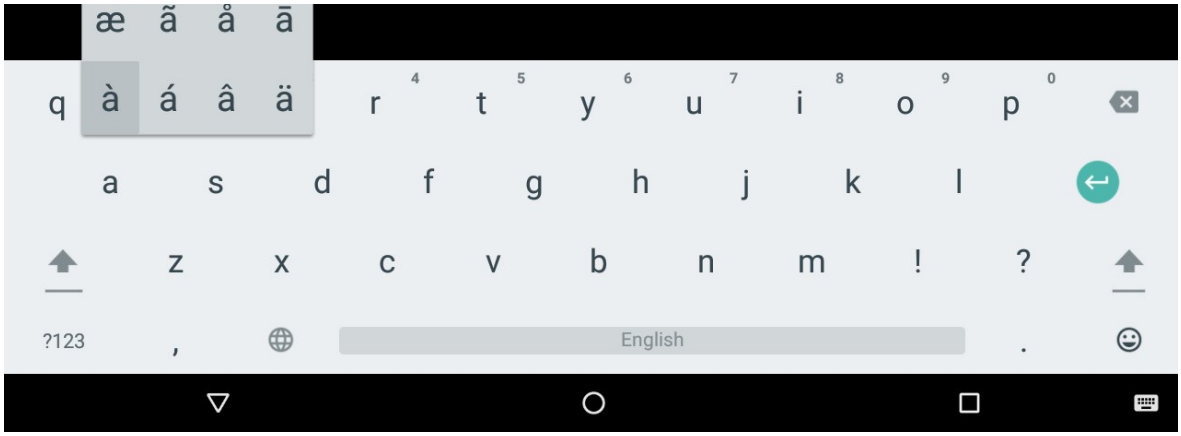
Let says you chose English and Russian.
Now, open a text app or message app, and tap the box to start to write something, the keyboard will be in english first and if you press **shift+space** or **slide along the space bar (or long press)** the keyboard will change from one language to the other (or open a popup-box to choose the selected languages).

For **accentuated letters**, let says 'à' you need to long press the 'a' key and it will open a popup-menu with accentuated version of the 'a' letter.

If you use a physical keyboard, a bluetooth or a USB keyboard, press **left-alt** (sometimes longpress) and it will open the virtual-keyboards with emoticons or accent letters, then tap **'ABC'** on screen to see the different letters that are not available on your physical keyboard.



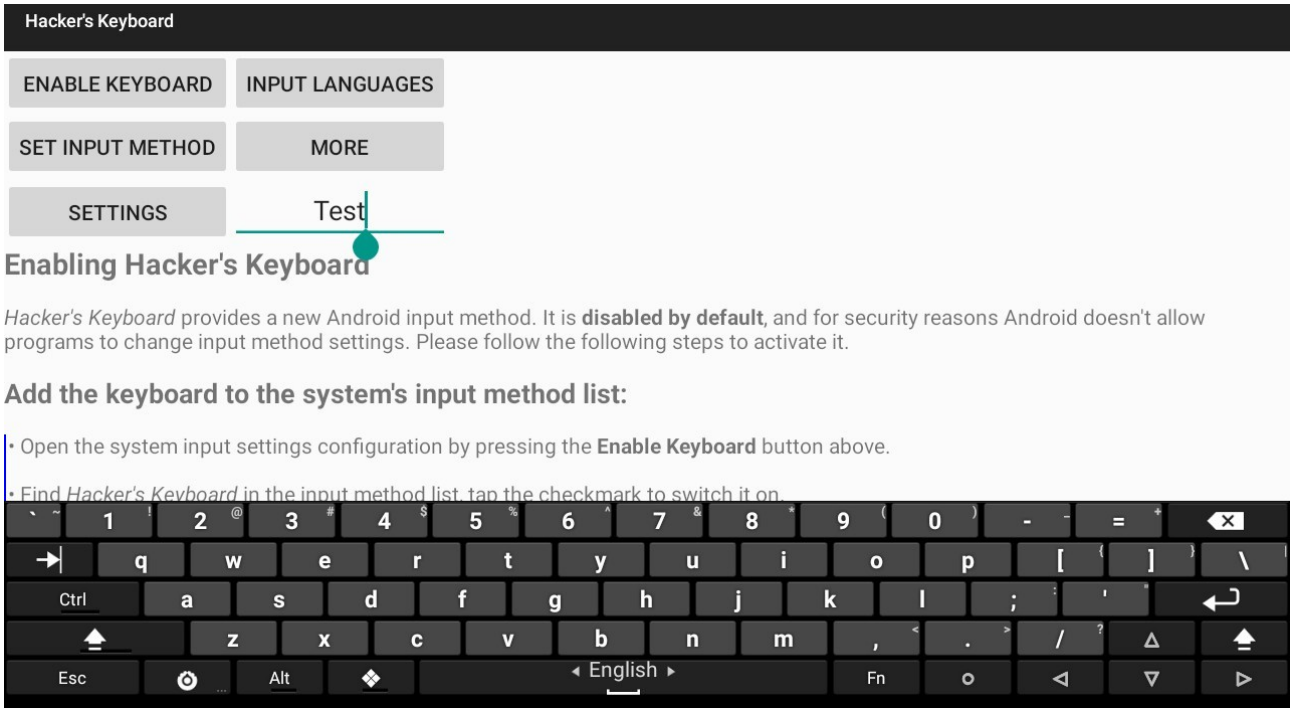
Press left alt on your physicial keyboard, then tap ABC on the screen



Long press the ‘a’ key will drop open all the accentuated versions to choose one

For **emoticons** you should see a face/smiley key on the virtual keyboard layout, or press **left+alt**.

Now, if you want a virtual keyboard more adapted to 'computer-typing' and hacker-like, you can install the app **'Hacker's-Keyboard'** that replace the **Android-keyboard** (you can enable/disable it anytime) and it is tweakable and themeable, to have all the keys like a computer: **control alt shift etc**, that are usualy not available on virtual keyboards on mobile devices.



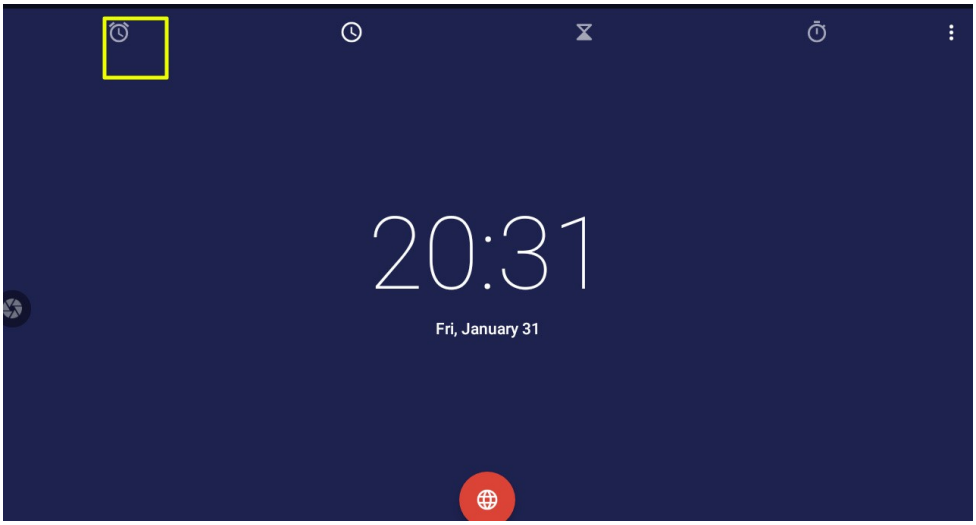
09-Setting up an alarm clock

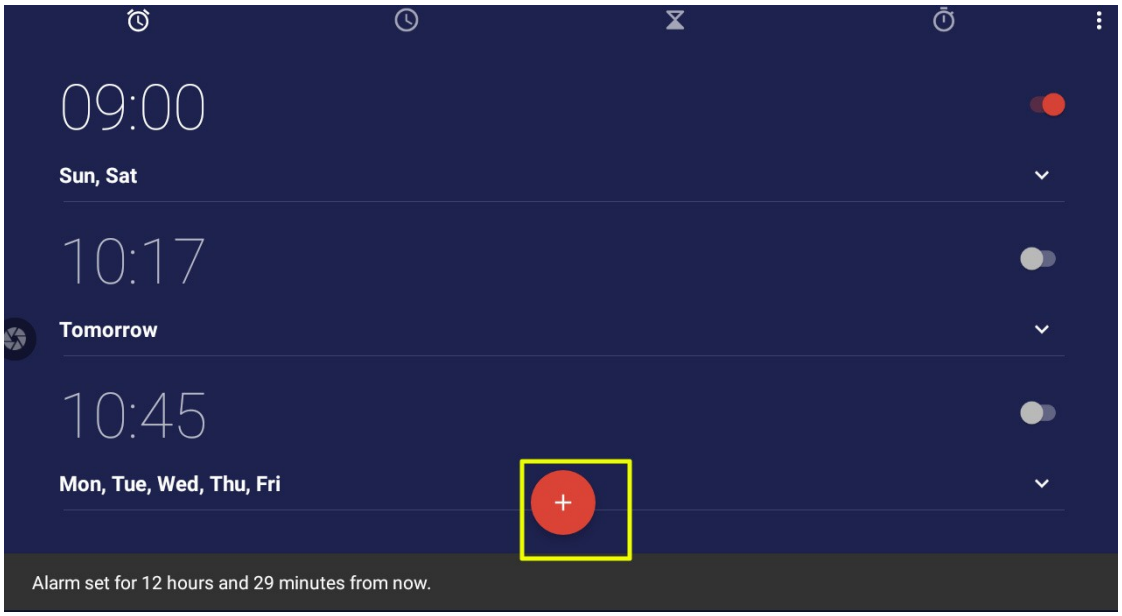
Setting up an alarm clock is very easy, though the Android clock app may differ from on version to another or from different manufacturers (or if you installed a third party clock app), but they remain similar.

Tap the **clock icon**, (opens the clock app)
Tap the **alarm-clock/ring icon/button**,
Tap the **'+'** button to create a new alarm,
  now set the wanted time directly on the clock
  by touching the hour and minute,
  or by entering the numbers (digital).
Tap the **'OK'** button.

(see pictures underneath)

Now the alarm is added in the list, and it will
shows a popup message **'Alarm clock is set for XY hours ...'**





10-Setting up a calendar event

Setting up a calendar event is quite similar,
and the event can be repeated every months etc.

Tap the **calendar app icon.**
Tap the **'+'** button icon that must be in a corner of the screen,
   or the **3-dots icon** to display the menu, then '**add event**'
  then enter a date/month and if the event must be repeated
  every weeks or months or yearly,
Then tap 'OK'.

Then the event will be visible onto the calendar now.

Now with the default Google app calendar you may need to
be logged-in with a **google account** (synchronised calendar).

But you can also have a **separate offline calendar app** that
can work without network access of course.

11-Connecting a bluetooth device: audio, gamepad, keyboard

Slide down the notifications from the top of the screen, then again to see system-icons, now tap the **'bluetooth'** icon, you can see the connected peripherals, now tap **'More settings'** and it will open the bluetooth setting screen.

(see pictures, next page)

You can also do it that way: **tap the setting gear icon**, then '**bluetooth**'.
There is the switch to turn bluetooth on/off.

And 2 lists, the **first list is the paired/connected devices**,
and the **second list is the detected devices** that can be connected.
(they could both be empty tho)

And the **3-dots icon** at the **top right of the screen**, you can tap it, then **'refresh'**, and it will scan and display bluetooth peripherals that it can detect in the second list.

So, **turn on your bluetooth gamepad or keyboard**, then check on your android screen (**you may tap 'refresh'**) then in the bottom list you would see either names:

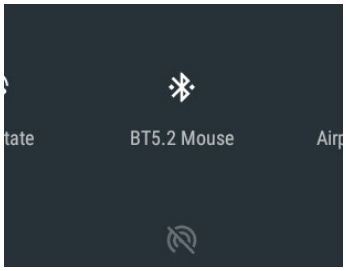
  'gamepad-BT'
  'earphonesX23'

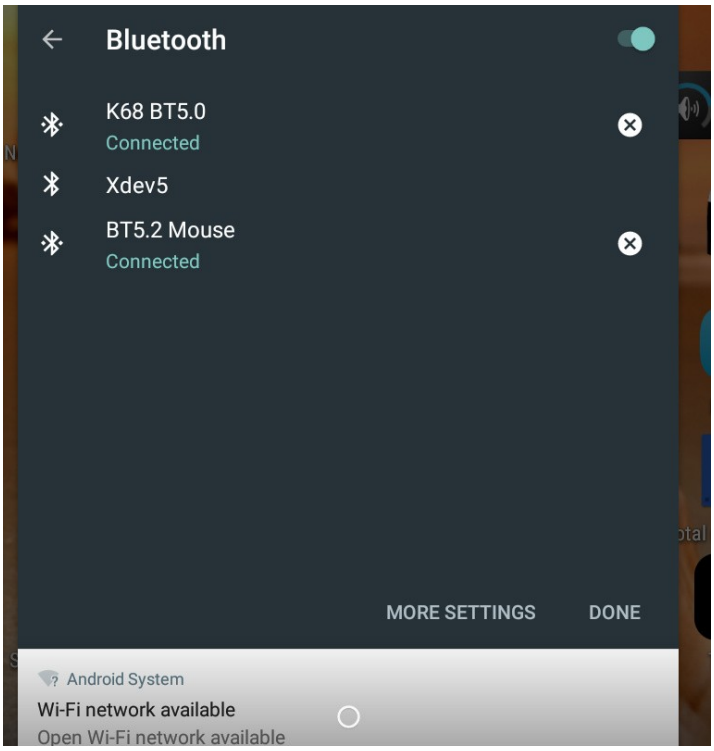
or numbers (BT addresses) like:

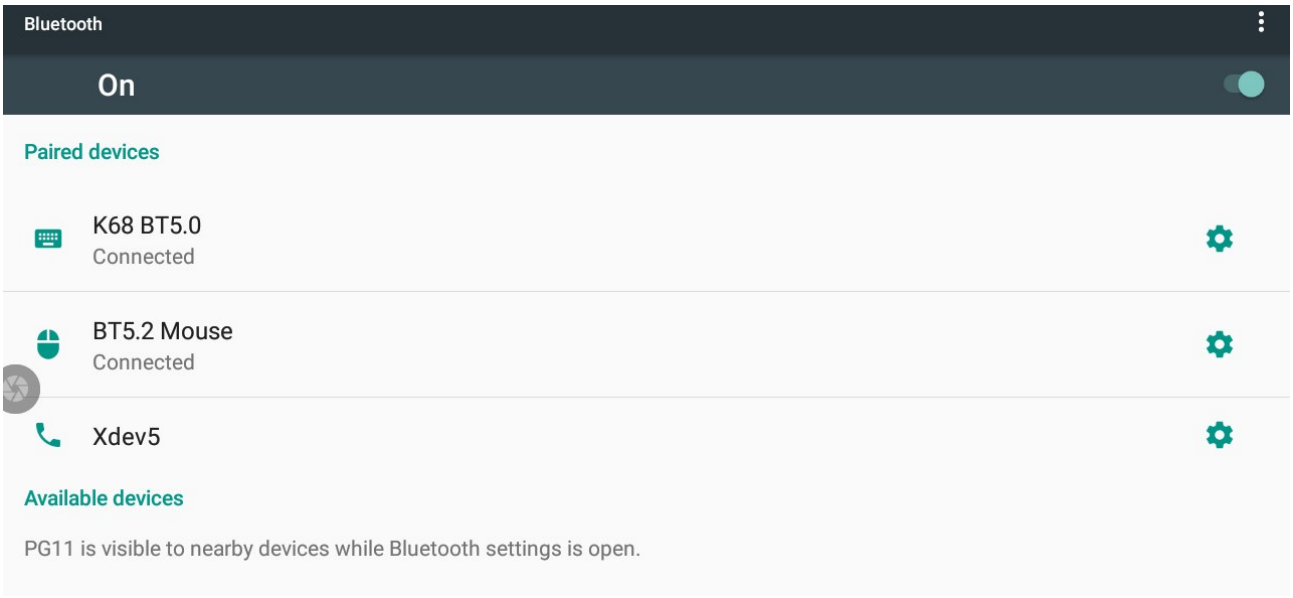
  '3b:45:22:5V'
  '6f:63:7z:22'

And you tap the corresponding name/address to **'pair'** your peripheral.
'pair' means it is associated with your Android, it will recognise it, and can reconnect automaticly later on.

Now, once paired, the device appear in the top list, tap it on the first list and now it is connected, and you can use it.
(sometimes it can connect directly when you pair it)
(it will print 'connected' underneath)







If you need to **remove a peripheral (unpair)**, **long press its name** then **tap 'Forget'**.

NOTE:
-Sometimes pairing just a mouse can prevent the virtual android keyboard to appear (because it is detected as an input) and in that case you need to force the virtual keyboard onscreen (in the settings of the android keyboard)

-Sometimes there can be bluetooth connection issue/parasiting, because of parasiting noise frequencies emitted from another device/machine around, but it is rare.

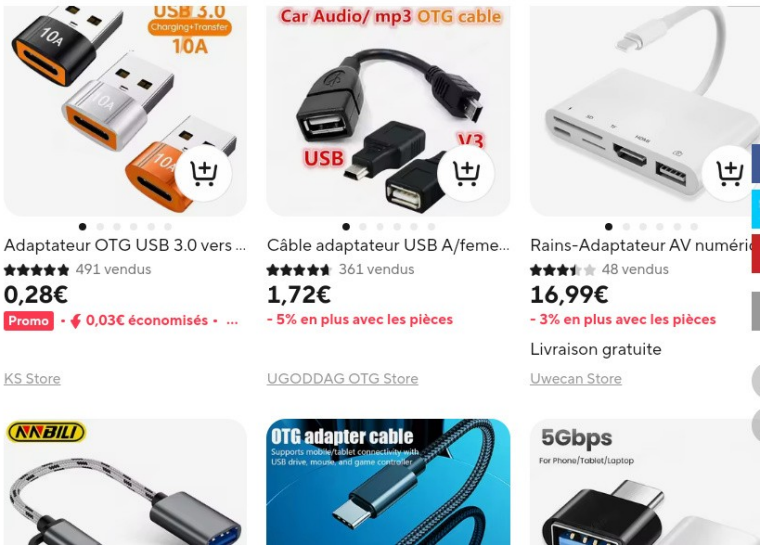
-There can be lag input / glitches because of bad wireless connection or bluetooth limited bandwith if you use at the same time wireless earphones and gamepad and share the connection etc.
For gamers you can still connect a wired gamepad to fix the situation.

-There is different version of the bluetooth protocol (actually 5.0) that are normaly backward compatible, but double check your peripheral BT version and your Android version to get the better suited setup.

Bluetooth can be used as remote controller for neon lighting or home speakers, keychain beepers so you don't loose/forget them, robot/car-toy controllers, and more.

12-OTG adapter, gamepads/USB peripherals/USB HUB/sound/HDMI output compatibility

The **OTG adapter** (OnTheGo) is a tiny cable with male-USB-TypeC on one side that you connect to the phone or tablet, and a female-USB on the other side to plug any kind of USB peripheral: a keyboard, a gamepad, a mouse, a USB stick or hard drive, an ethernet connection and so on.



Warning tho, the OTG adapter is a bit special, so you don't want to use other connectors between the Android device and before the OTG cable. (it is wired specialy or has a chip inside)
But you can use another adapter AFTER the cable, ex :
Android > OTG cable > USB to SD > Sdcard, in order to read another SDcard via the USB port.

Limitations:

So when you connect an OTG cable usualy you cannot have power supply at the same time.
Some Android devices are able to output sound from the USB or HDMI video output with special cables too, but you need to check if your phone or tablet can do that if you need it.

Note that anything you plug on your Android device using OTG adapter is supported out of the box (no need for drivers), however there can be a control app to install, like for the **hobbist Arduino developer**, or other things, for a Neon-color-LED-blinking lamp that you would connect using bluetooth or USB, and it would came with an app so you can change the colors and so on (app / apk to install but no 'driver').

If the USB device you connect does not work and do not have a special .apk app for it, it most likely means the device is broken or incompatible with Android, so the best thing to do is to test it on another hardware, PC or console etc.

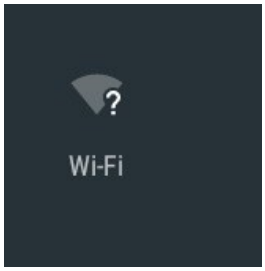
13-Connect to a WIFI network

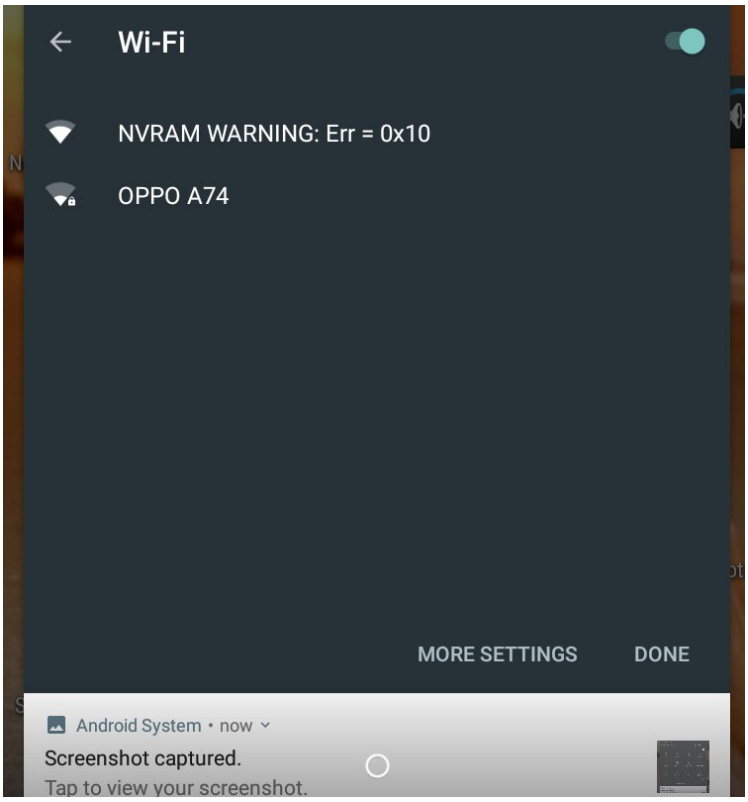
Slide down the **top screen notification and system icons**, now **longpress on the WIFI icon**, it will open the WIFI network list.

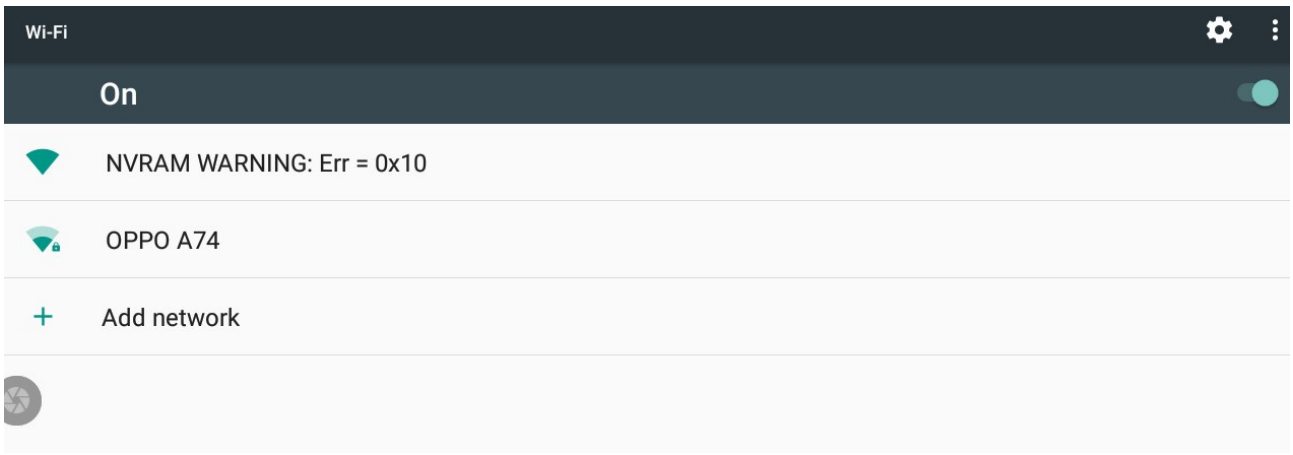
(you can also access it via settings: **tap the settings gear icon** from the home screen, then **tap "WIFI"**)

Now you will **see the list of WIFI network around** you that you can connect to, **tap the selected network** you know, then it will ask you for the password, **enter the password** and then **ok**, and now you should be connected. If the network is **not visible**, try to **tap on the top right 3-dots icon** of the screen then **'Refresh'** and it will scan again to see if it discover new networks.

if you need to **remove a network**, **long press the network name** then tap **'Forget'**.







14-Share your internet connection (become a hotspot, WIFI or bluetooth)

Android can **share the internet connection** of the device to others,
there is **2 methods** to do that:

1) using the **WIFI**
2) using the **Bluetooth**

Slide down from the top of the screen the notification and system icons, now in the list you should see **'Hotspot'**, if you don't see it, try to slide the system icons on the left or right. (if it's still not there open the **system settings**, gear icon, then **'More'**, **'Hotspot'** or **'Tethering'**)
Now you can long press 'Hotspot' and it will open the hotspot configuration, in **'Tethering & portable hotspot'**, **'Wifi-hotspot'** or **'Bluetooth-tethering'**,

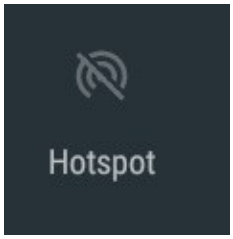
'Wifi-hotspot' is the fastest and you can connect easily like any other wifi wireless network, so you can choose that one, set a network name, then a password and activate it.
Now every other people around if they scan the WIFI networks will see your network and if they have the password they can connect and use your internet connection or transfer files with you.
(users that connect do not need validation from you, means they can connect anytime if the hotspot is activated, though **you can see if someone is connected to your device in the settings/hotspot/infos**)

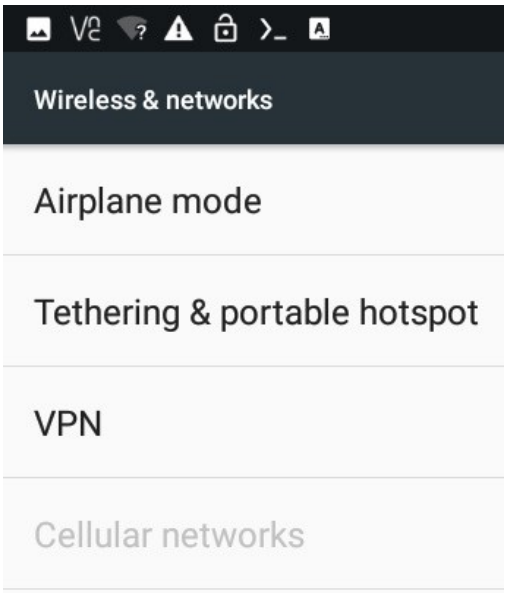
The other option is **'Bluetooth-tethering'**, the **bluetooth connection sharing is much slower and limited in distance to 10 meters** or less (a bit more like a remote controller), someone outside your room will not very well be able to connect to it.
And for this method **you need to validate manualy the connection on your screen**, sometimes with a key (like if you were plugging a cable).

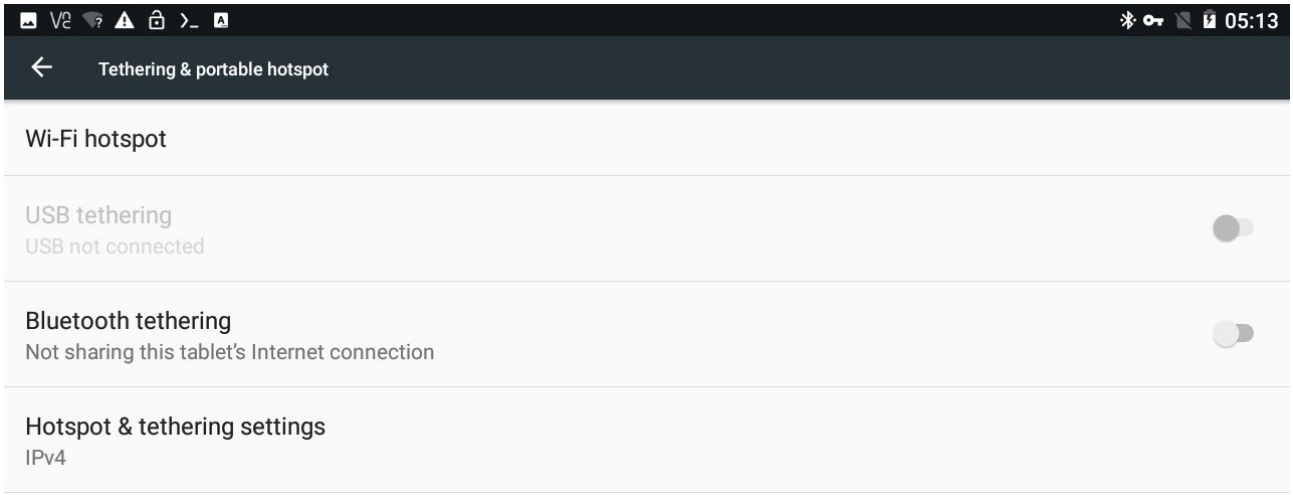
WIFI hotspot: faster and more powerfull signal, anyone can connect if they have the password, or with an open hotspot(no pass)

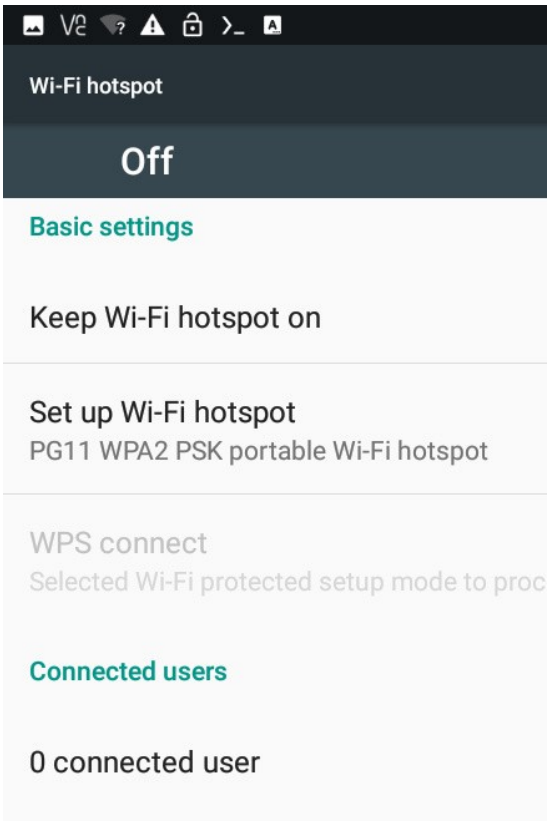
Bluetooth tethering: slower, limited to your room, needs manual validation from you to activate the connection.

(see pictures in the next page)


Hotspot


Wireless & networks
Airplane mode
Tethering & portable hotspot
VPN
Cellular networks


05:13
Tethering & portable hotspot
Wi-Fi hotspot
USB tethering
USB not connected
Bluetooth tethering
Not sharing this tablet's Internet connection
Hotspot & tethering settings
IPv4


Wi-Fi hotspot
Off
Basic settings
Keep Wi-Fi hotspot on
Set up Wi-Fi hotspot
PG11 WPA2 PSK portable Wi-Fi hotspot
WPS connect
Selected Wi-Fi protected setup mode to proc
Connected users
0 connected user

15-Installing an application (app)

Installing an app is quite easy, open the **Google playstore** from the triangle playstore icon, then in the search bar try to find a game or something or **choose one of the app** that the playstore will suggest you, then **tap install**, and that's about it.

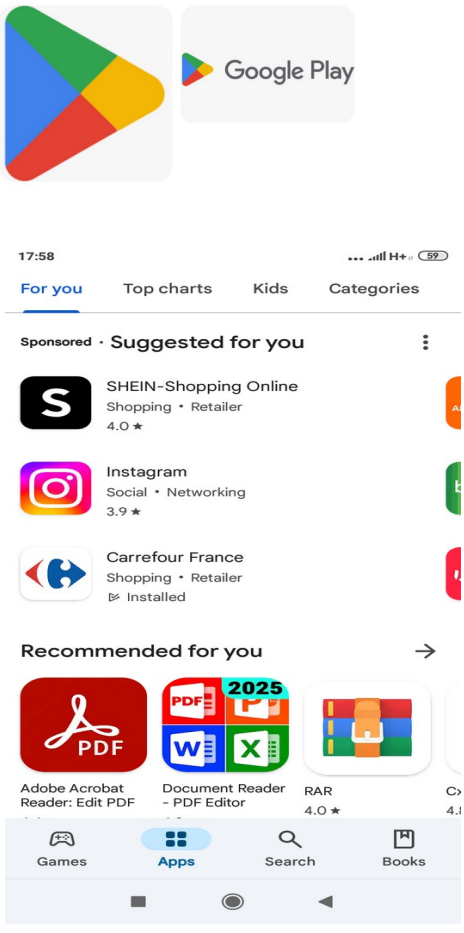
And you will **find the icon of the app** either **on the desktop launcher** directly **and/or in the app drawer (3dots icon)**

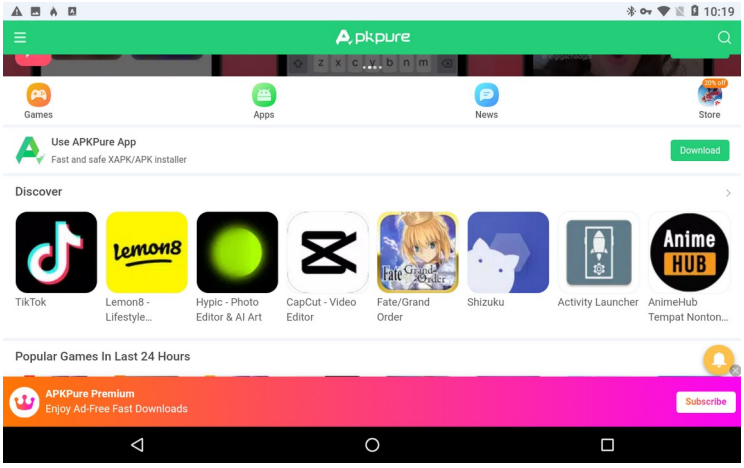
Now there are **other application stores**, the ones from the **manufacturers** sometimes like Samsung or others (also depending from your country Asia/EU/...), and also the ones from the internet like **apkpure.com** from the website or their app that they provides with different versions and archives of many applications. **F-droid.org** (Free Droid) is another app store that provides only open source applications. And because some applications sometimes disappear from the official playstore, if you look for them you may still find them on **apkpure** or **apkmirror** and other places.

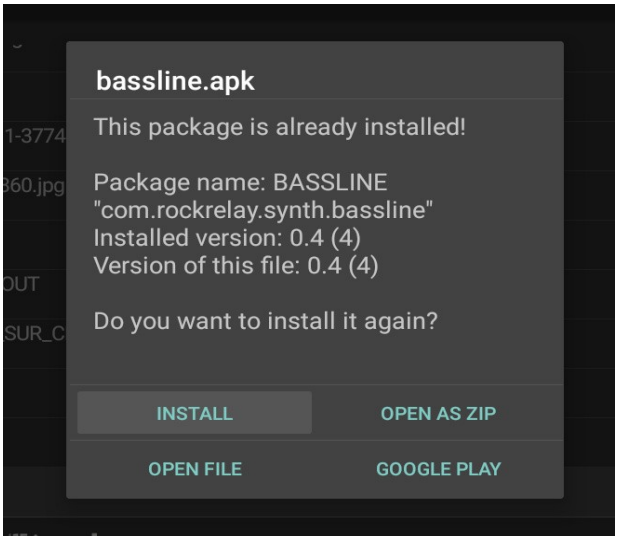
The last method (also with apkpure) is **with the .apk file**, you download the .apk file from apkpure website, then you open your file explorer and you tap the .apk file, it will ask you if you want to install it.

If you install an .apk file, you will have to activate **'allow install from unkown sources'** in the **security** section of the **settings** (gear icon, settings / security), a good idea is to keep it off, and turn it on only when you need it.

And watchout the permissions that the app will ask when installing it, for instance internet / storage access to files / access to camera etc, but normaly if you want to install it, you have to accept them, remember that you can block the internet access to that app tho.







16-Security (checksum, firewall and antivirus)

Android is quite **secure** and applications are tested and reviewed by users, but beware of unknown or shady applications anyway, **the app itself cannot modify the Android system** so it is **virus proof** at the system level, but if you install it, and give it permission, it can of course read or modify your files, and upload or download things weither it is an update or anything.

Malicious app can connect to the internet and eventually spy, or do weird thing...a bad app could crypt your data or erase your files, so don't install an app that someone you don’t know send you over the internet.

Other apps could do shady botnet things in the background without being suspicious at all or other things.

And that's also why some people are all about **open source apps** (like on **f-droid.org**) because people can review the source code (how the app is created, internal functions), and prevent 'ghost' activities etc.
But usualy it's not the case and most apps are safe.

App .apk files are **signed and secured**, which means it is complicated or not possible to modify apps, checksums are verified to be sure the files are not modified and prevent hacking/cracking.

Some manufacturers offers a **virus app scanning** on top, and if you install a **firewall** like N**oroot-firewall** you can block the internet based on the app names or IP/port it wants to connect to.

And you can also **stay offline sometimes**, so that no apps can connect anywhere of course.

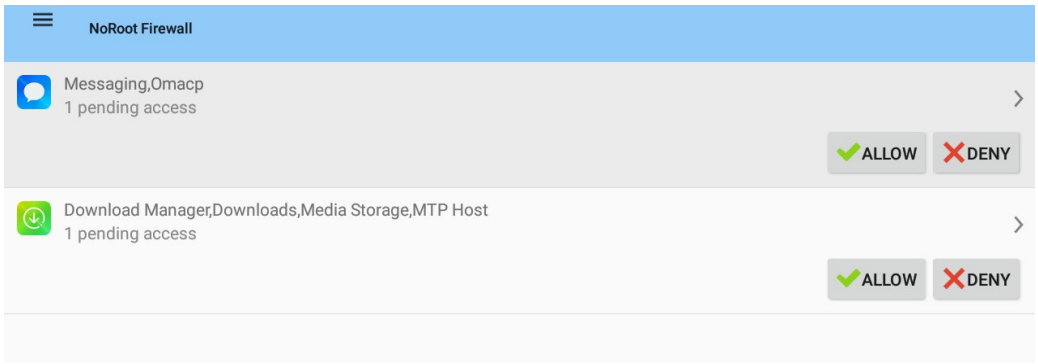
17-VPN and firewall

Like mentioned before, **Noroot-firewall** enable the user to **filter app** the **access to the network**, and other firewall apps could do the same with added configuration/permission.
The firewall drops a notification when an app wants to connect, and you can choose yes or no, then with rules you can allow only HTTP port or other thing like any kind of firewall (stateful firewall).

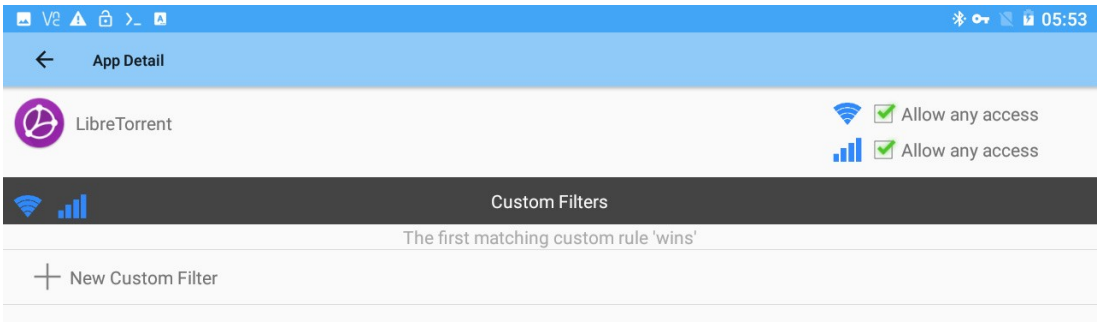
Now **VPNs** are also populars, they provides some **anonymity** and **bypass censoring** online, (***warning tho, because it can be illegal in some countries***),
solution like **OpenVPN** allows the users to create a **VPN tunnel** (**Virtual Private Network**) So it can be for your company hosting a VPN server, private network, and for most people they access a **VPN service provider**.

The **VPN providers** offers **their own Android app** to use their services but they can be compatible with OpenVPN most of the time.
(ex: **NordVPN, ProtonVPN, ExpressVPN**)

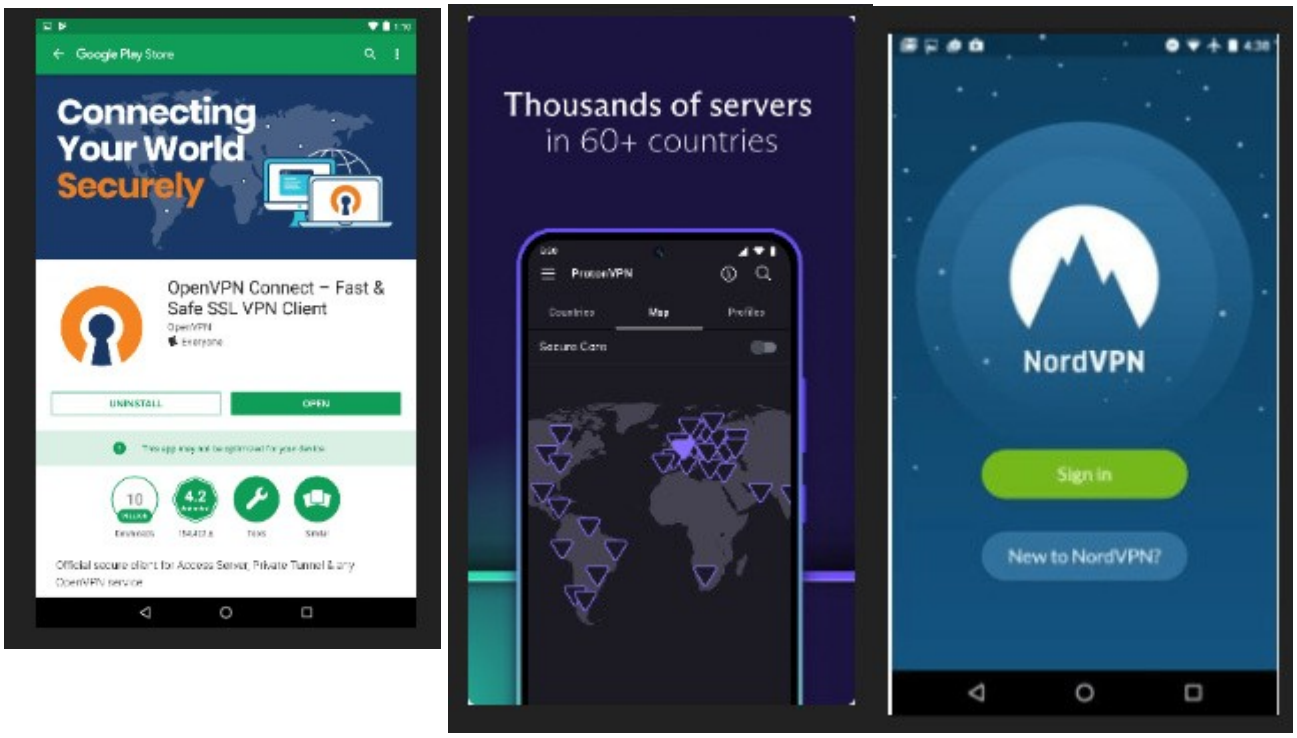
(check online for more informations about VPNs, see pictures in the next page)



NoRoot-firewall app request



Libretorrent p2p sharing app



Different VPN options

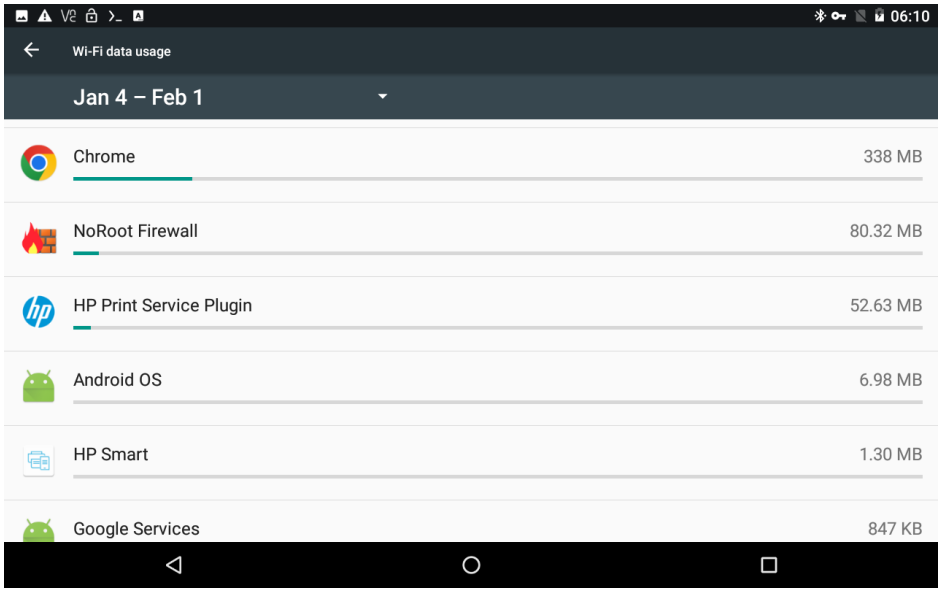
18-Internet data usage

Go into Android **settings**, now you will find **'Data usage'**, tap on it, and it is self describing with few parameters to config, it does keep a track of the **data usage per months** and can display what application used the more **bandwidth**, how and when..

Now if you don't want to be annoyed by **background updates** of random applications, **disable your internet connectivity**(4G 5G mobile off and WIFI off).

Then remember if you like youtube videos, that **streaming can use a lot of bandwith** sometimes, if you watch the videos in 360p or 720p it won't be the same. **Downloading a game** or a large file also of course.

data usage / data plan



19-Wireless communication between 2 Android devices (file transfer)

The best way is to **enable the hotpot mode** on WIFI on the **first device**, and **connect** the **second device** onto that WIFI **hotspot** (see previous chapter).

Now the 2 devices are connected, and you can start an **FTP app** for example to transfer a file between device 1 and device 2, now at this stage you must know about IP:port, the IP addresses of the 2 devices and communication port number. One **important** thing to note is that on Android **low number ports are NOT accessible** because of **security reason**, normaly an FTP server often use port **21**, and on android it could be port **2121 instead**, because **all ports under 1024 are locked (security).**
There can be alternative apps to transfer files or to communicate between the devices.

If you want to **transfer files online**, best thing is to use your **cloud storage** like **Google-drive** with address share, or an **open platform website** to transfer pictures like **imgur.com** or **pastebin.com**. (with public http address)

Remember that transfering files with a USB stick with OTG adapter will be much faster !!

WARNING tho: always use your own USB sticks (because of **'USB killers'**), if you plug an **unknown USB stick** to your device it **could burn the USB plug**, and **there is often only ONE USB plug on Android devices**, the charging port, which **could break the device** (you can't charge it anymore) ! **BEWARE**.
(fake USB sticks intended to break/burn the USB)

And there is also the **SDcard transfer**, there is no 'SDcard killer' as far as i know, and there are adapters so that **you can use an SDcard with the OTG adapter**: SDcard inside a USBreader inside the OTG adapter so you don't have to open the phone/tablet to read or write the SDcard

20-Taking screenshot

Out of the box you should be able to directly make a screenshot with your Android device, slide down the top notification panel and the system icons, now in the icon list you must have **'screenshot'**, and if you tap it, it will take a screenshot of the actual display. If the icon is not there, look on all the icons right slide the system icons, then you may have to add it using the **'EDIT'** button, or eventually it's not available on your Android version and you need a separate app to do it (see just after that).

Now, in all cases, if you have a **physical keyboard** connected to your Android device, if you press the **'PrintScreen' key**
(sometimes **'PrtScr'** or with the function key **'Fn + Home'** or other)
it will take a screenshot also.

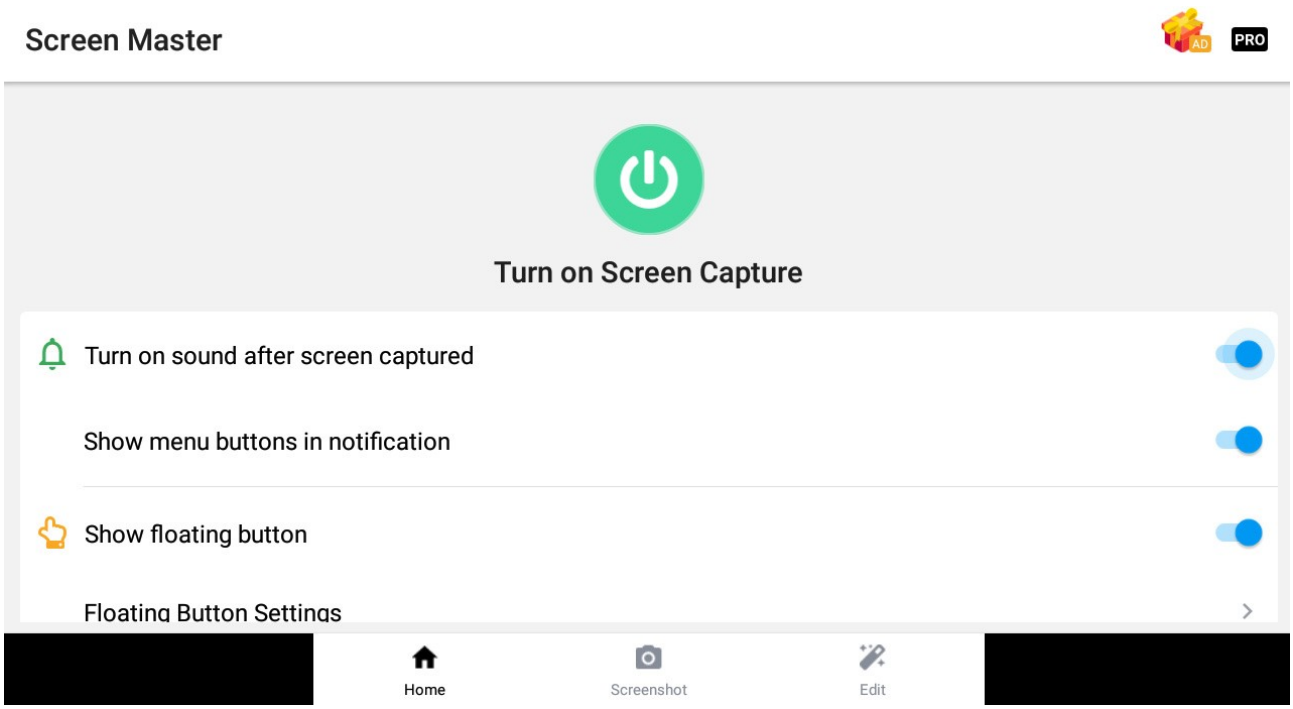
And the **screenshot pictures** will be **located** in the folder **"DCIM/Pictures/"** or just **"Picture/"**, depending (could be another like that).

Now you may need to or want to **install a separate app to take screenshots**, like **ScreenMaster**, so go for it, you just install the screenshot app normaly, then once activated you can take screenshots either with a button in the notification panel or with a floating button on screen.
In that case with **ScreenMaster app** the screenshot will be located in the folder **"ScreenMaster/"**

And now you can take screenshots anytime with a tap on the screen
or by pressing the PrintScreen key.

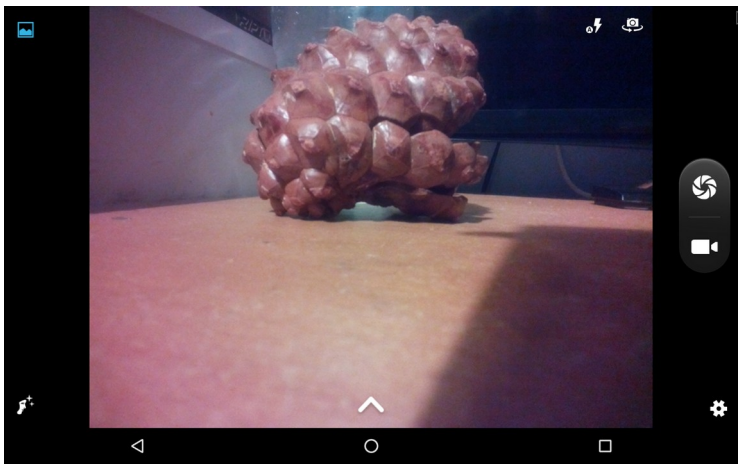
Or Nearly, because some applications are 'secured' to prevent you from taking screenshots, it could be private mode of you browser,
and also the **Tor-Browser** used to surf the darknet will not
let you take a screenshot.
And you're forced to use a second phone/tablet to take a photo of
the first one instead of a screenshot.

You may also want to record video of your gameplay, and there are probably apps to do that too.

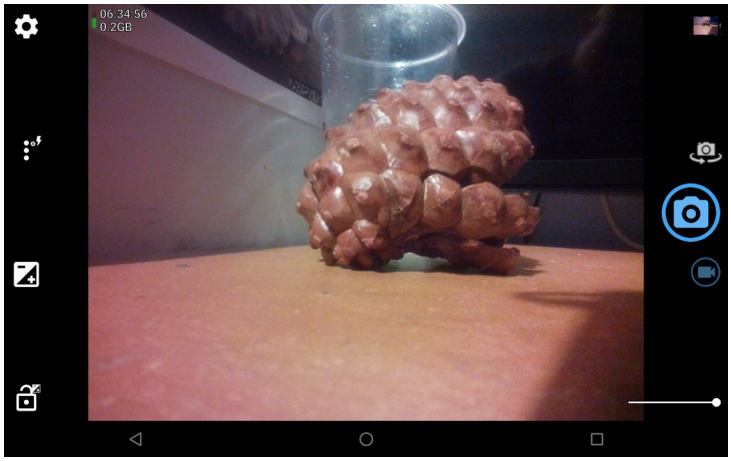


21-Photos and videos

Not much to say here, it's pretty straight forward,
you tap the camera icon (a lens icon or cam icon) then like the old digital cameras of the days you can set automatic flash or adjust few thing like contrast etc, you can touch a position of the screen to make the focus sharpen on the scene object, and some devices have more options regarding the camera possibilities. And you can record videos instead of taking photos of course.
And because most Android devices have a front and back camera you can switch between the 2, 1 to take a selfie, and the 2nd one to take of photo of the environment (tap the arrow/flip icon).



You can install other apps that deals with the camera, like **Open-camera** that have insteresting options and as a second camera app. Tchat applications like **Snapchat** can have **fun camera toys** to add cats ears or fake noze using augmented reality to take fun selfies.



Photos and videos can take **A LOT of storage space** on your Android device because today they are **very high resolution**, and a single photo can take up to **4 Megabytes** or more.
Same for **videos** that can takes **hundreds of Megabytes and much more**.

The photos and videos will be located in the folder "DCIM/Camera/"

Now there are some apps that can **change the resolution of the pictures** in a batch or recompress them, **'Photo editor'** is one of them, and the size can be reduced quite a bit, have a look online.

22-Audio and streaming

There is usualy a **default music player** that can play most music files, and the icon will be a **music note** or a **speaker**, just called **'Music'**, just tap it, and if you have some music files around it will play them just fine.

Many Android devices offers an **FM radio app**, it can scan the radio waves to find radio channels and play them, and usualy you need to plug a wired headphone that is used as antenna to get better radio reception (analog FM radio that is), but people today prefers to stream internet radios or music from websites like **SoundCloud** or **Spotify** or **Youtube music**, etc.

VLC Videolan is a famous **media player** that can play almost all music formats and also videos, and can **stream medias** from the internet.

File explorers like **Total-commander** integrates small music player out of the box also.

23-Use a printer (print documents)

Wireless printers on Android works pretty well,
first when you **power up your printer**, the printer will start an **open WIFI hotspot** without password (means anyone can connect on the printer WIFI)
So you can **connect to it**, and now if you know the IP address of the printer you can **open your web-browser** and **access the printer site**, something like:
"http://192.168.32.1"

(sometimes your browser can ask if you're sure to connect)
(and/or you may need another browser, chrome or firefox)
(see bottom left 'advanced', see screenshots a bit after)

Note: You can also skip that part and directly install the app provided by the manufacturer of the printer (see a bit after that)

Now you can **configure the printer**, you may have to **enter the serial number** from the printer-id-sticker to continue, and now you can make the printer connect to your own network or change the password and so on.

Note that the printer website do NOT need the internet
(it is a website that is actually on the printer itself)

If you need to **find the IP of the printer**, check your own IP address first, slide open the notifications and system icon, **tap the WIFI icon**, and in the **WIFI setting** (when connected to the printer) **tap the gear icon in the top right corner**, now in that screen it will be written "IPv4 Address" and the address underneath ex **"192.168.43.223"**.
Now in that case the printer would most likely be **"192.168.43.1"**.
(replace the last number of your own IP with a 1)

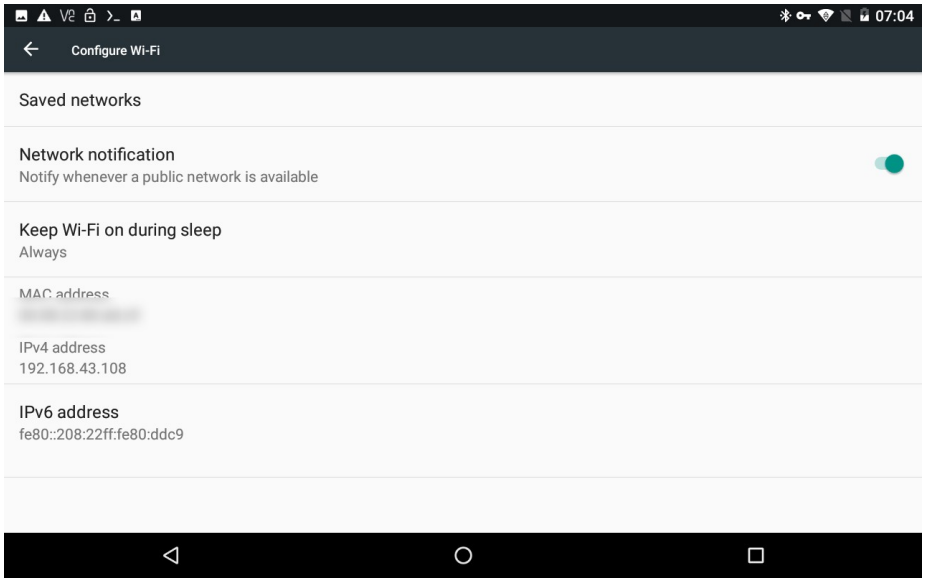
Otherwise have a look on the internet forum or manual of the printer.

Then to really use your printer you need to **install the app** from the manufacturer, **HP**, **Canon, EPSON** or others will have a dedicated app for your printer model, and it is streamlined and intuitive.
(configure black/white or color, print quality, change size etc)

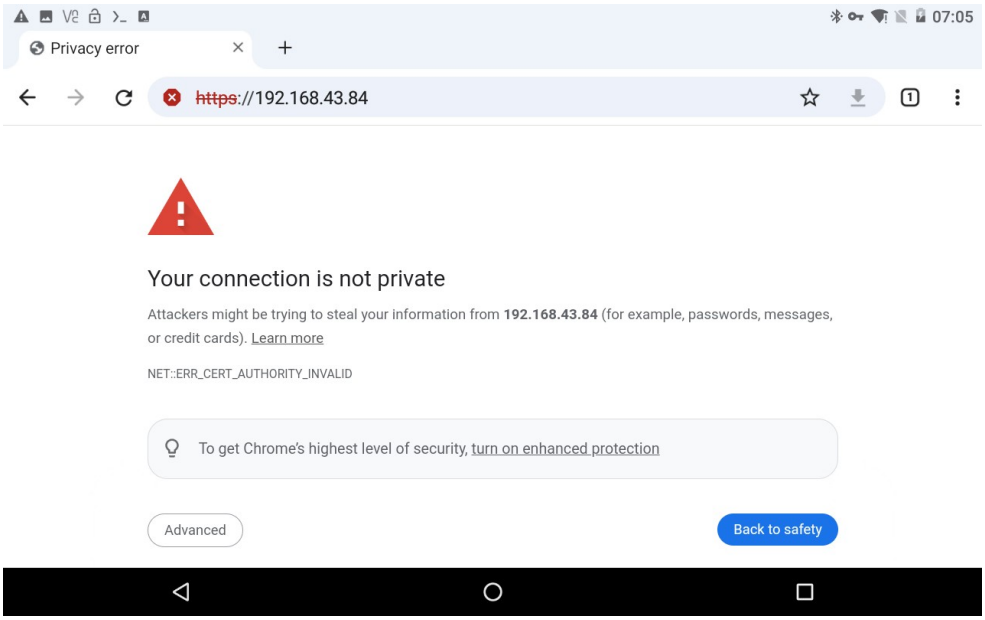
Note: sometimes you need to install 2 apps! A service app and the user app

Note that in any case of printer connection problem you can **factory reset your printer** with a **special key combo** like pressing 3 seconds on button power + copy. Again, have a **look at the printer manual**.

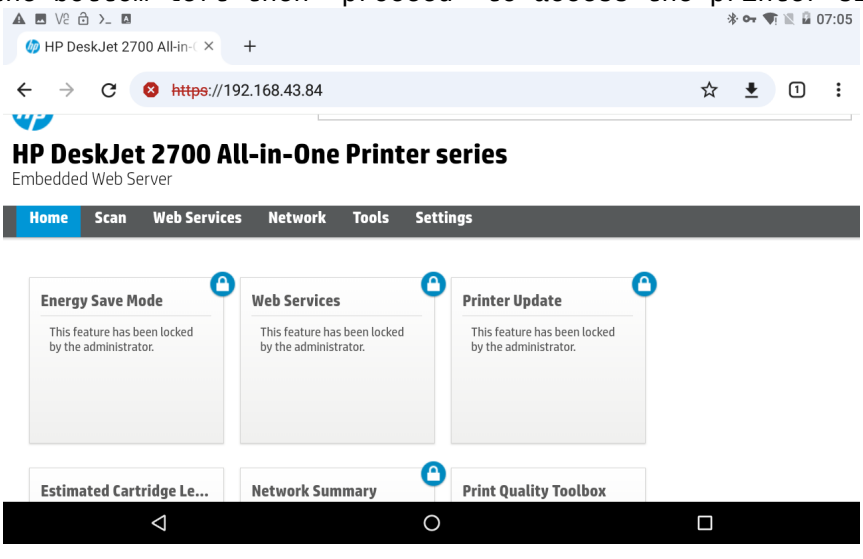
(see pictures on next page)

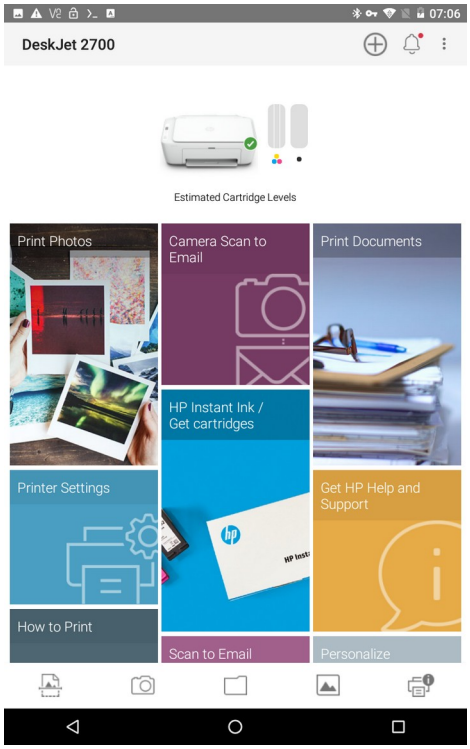


in the WIFI settings (top right gear icon) the IP of my Android is:
192.168.43.108

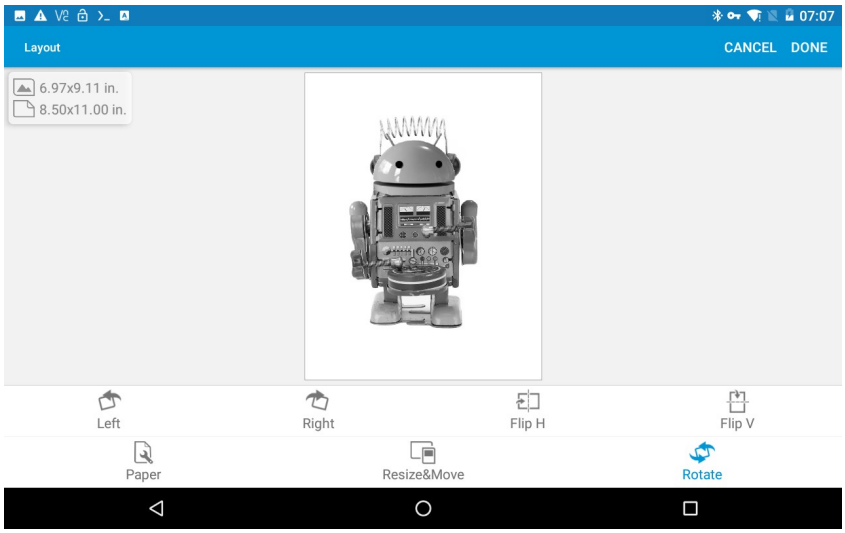


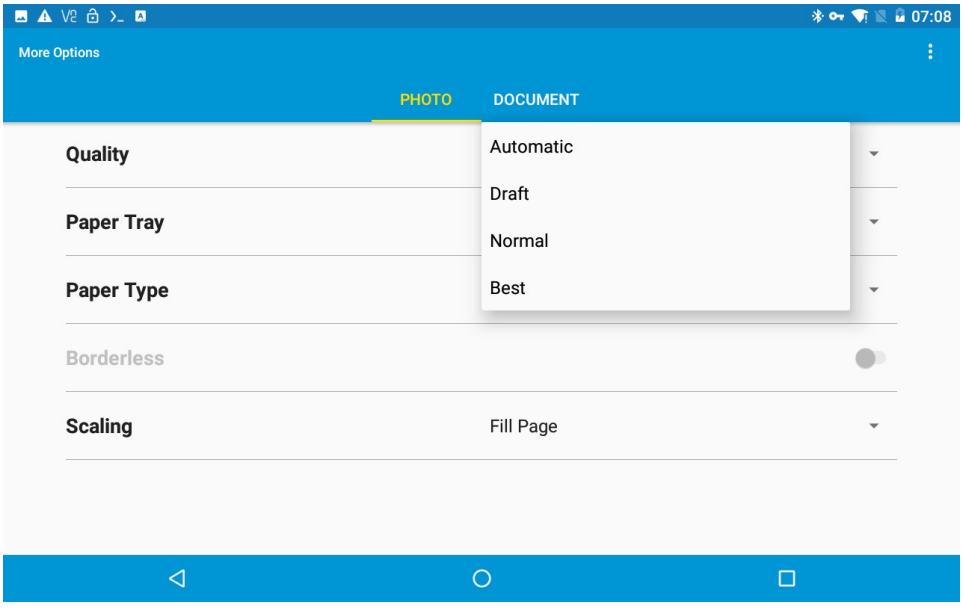
Now my printer is 192.168.43.84 because i am connected to a HUB and i already configured it, but if you are connected to your printer directly it would be 192.168.43.1
(for example the first time you connect to your printer)
if you got the same message in your browser tap the 'Advanced' button in the bottom left then 'proceed' to access the printer site





The printer app





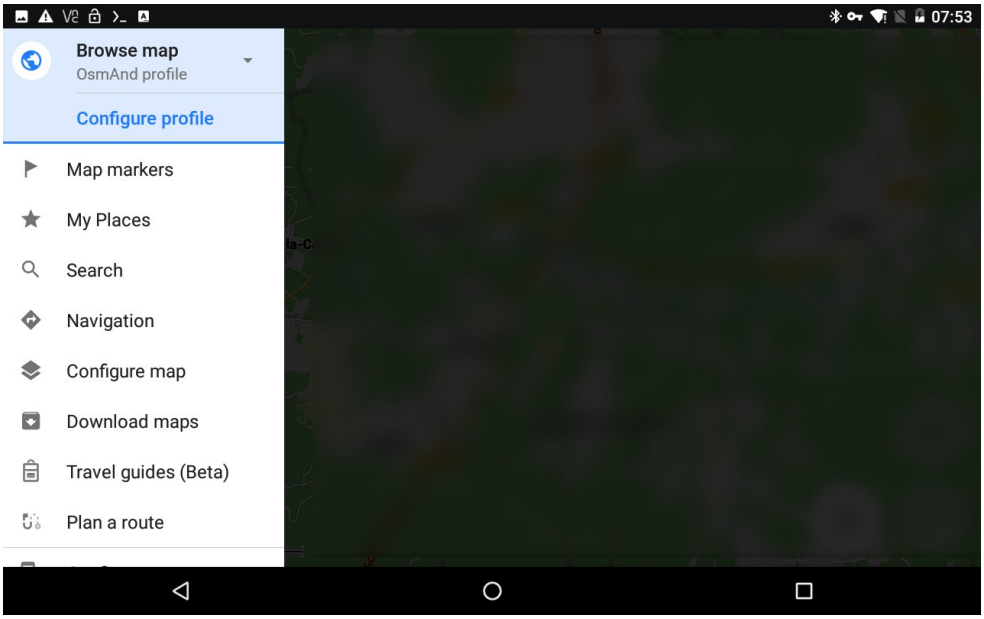
24-Location, Satellite guiding / positionning / (maps, roads, addresses)

Android devices usualy have a **satellite positionning capability**, in the notifications system icons, you can enable or disable **'Location'** a pointing-position bubble icon.

The default app is **Google-map** and needs internet connectivity as well to function properly. We won't go into the details of Google-map but you can search for a place, city, street, hotel, house, supermarkets, shops, restaurants anything, and you can zoom in/out easily, you can tap the compass icon to reposition the view properly.

There are **other map apps**, some of them can also **work offline** by **downloading the map data** onto the device, One of them is **OSMAnd+** and uses **OpenStreetMap**.

And you can find roads / trajectories / directions to go from one place to another.



25-Sensors (compass, accelerometer, and more)

Many Android devices offers different kind of **sensors**, all integrated, **compass** (north / south / east / west), **accelerometers**, and more, they can be handy or fun within games when you rotate the device and with augmented really apps and games.

Some phones can have **infrared** and be used as remote controller for older HIFI equipments, but nowdays bluetooth might be more interesting.

To see what kind of sensors you have you can install the **Droid-info** app that will shows all the **internal technical details** of your phone.

26-Hardware technical details

The **Droid-info** and other tech apps will tell you all about the **technical hardware details** of your phone or tablet, what **SoC / CPU** it is, how much **RAM**, what kind of **graphic chip** the version of **OpenGL-ES** and everything.

And apps like **Antutu** and **3Dmark** can benchmark the device gaming capabilities in 2D or 3D with GL shaders and CPU power etc.

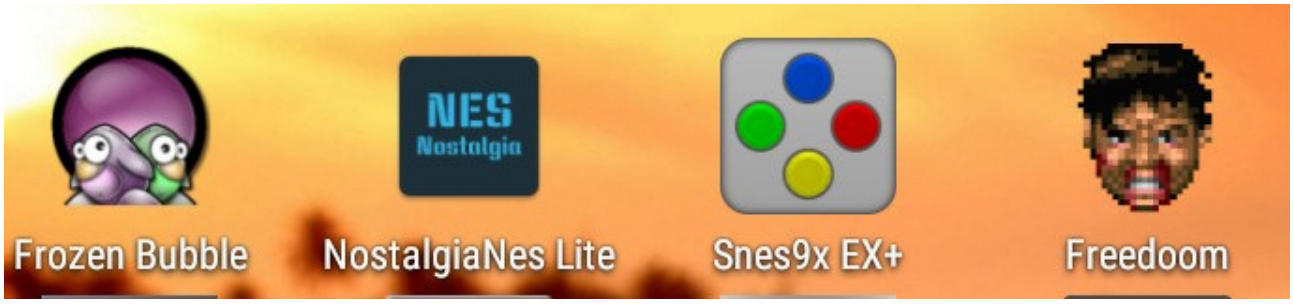
27-Vendor modifications

Vendors (**Samsung**, **Xiaomi**, **Sony**, ...) usually add their own apps and style/themeing, for instance the left info slide panel with weather or newsfeed, special camera app or player, backup tools or even **their own app store**.

Sometimes good, and sometimes can be annoying.

28-Emulations of old time videogames

Old computers (now very old, 8bits) like the 8b from **Atari** or **Amstrad** in the 1980s are now available with dumps of floppy disks on **Archive.org** or other sources and they had lots of application and old time pixel video games of the days, (sometimes from passionates or old companies that don't exist anymore since ages) centipede or space invaders, clones of pacman but also first sprite based videogames.
Then old consoles (usualy japanese hardware and games), are more prinky, but they are not sold anymore of course, you may had one of theses back in the days plugged onto a fat CRT TVs: **NES**, **SEGA MASTER**, **MEGADRIVE**, **SUPER NES** and so on, with plugs and materials that are not compatible at all with today's hardware, so the gaming experience with Android can matchup the real video game experience of theses days if you play it on a TV screen,
with an analog-TV shader effect and a bootleg gamepad of the 80s: (**snes**, **gameboy**, etc..)



29-Usefull apps: Total-commander, 7zip, Noroot-firewall, ...

Total-commander : Very good file explorer with 2 panels for copy/paste with plugins(FTP/cloud) and small integrated music player.

7-zip : Extract or create zip files and other compressed formats. (compressed files and archives)

NoRoot-firewall : Userland firewall that works everywhere and can block or filter any apps.

Comic-Screen : An ebook reader for comics or other documentations and mangas.

AD-Blocker-Browser : A browser like firefox and chrome that can block ads.

OSMAnd+ : A satellite map/direction positionning app, like Google-map, based on OpenStreetMap.

PhotoEditor : A photo editor to modify pictures, adjust brightness, ad effect, text and more. (also batch processing of many files).

Rotation-Control : Force rotation of the screen.

Disk-Usage : An app that displays what folders are taking up storage space.

Screen-Master : A screenshot app.

Termux : A linux terminal app for Android. (not emulated)

Wavepad : A sound editor.

Droid-info : An app that displays all the technical details about your device (hardware).

ATE : Take quick text notes, search/replace etc.

Infinite-design : Draw / paint with the touchscreen.

(see next page for a complete list of selected applications)

30-List of applications (our selection: graphic / audio music making / games ...)

GRAPHICS:
=========
Photo Editor 6.3.1 : a picture editing manipulation app
Infinite Design v3.3.19 : a hand drawing app with templates and gesture zoom
SketchPad 2.0.1 : another drawing app
3D Viewer 3.0 : a 3D .obj model viewer
Prisma3D - Modeling, Animation 2.1.1 : a polygonal 3D modeler
Sculpt+ 0.5.1a3 : a 3D sculpt app

MUSIC/AUDIO:
============
WavePad Free 12.21 : a wave editor to cut or put effects
Lamazik : a tiny music player
Bassline 0.4 : a music loop synthetiser box
Electrum Drum 10.0 : a drumbox
RD3 1.7.0 : a multi-effect synth/drum box combo
USB MIDI Monitor 1.0 : monitor your USB midi device
MidiScope 1.0 : test your midi device

SYSTEM AND TOOLS:
================
NoRoot Firewall 4.0.2 : a stateful firewall that don't need root
OpenVPN Connect 3.2.4 : the open VPN app to connect to any VPN server
LibreTorrent 3.0 : a torrent p2p client for file sharing
Hacker s Keyboard v1.40.7 : a complete virtual keyboard with missing keys
Lesser AudioSwitch 2.7.2 : a tool to force audio on the headphone or speakers
Total Commander 3.23 : a complete file explorer
TotalCmd-FTP (File Transfers) 2.42 : FTP plugin for total commander
TotalCmd-LAN (Windows shares) 3.20 : LAN plugin for total commander
TotalCmd-SFTP 2.5 : SFTP plugin for total commander
Totalcmd-Drive 2.10 : cloud plugin for total commander
Ghost Commander 1.62.3 : another similar file explorer (open source)
QuickEdit+ 1.7.5 : a text editor
ATE : another text editor
Firefox Fast & Private Browser 116.2.0 : The Firefox web browser (no shortcuts)
Free Adblocker Browser : another web browser that stop advertising / pub banners
Tor Browser 10.5.3 : The TOR web browser to surf the darknet
VLC 3.3.4 : The videolan player, plays all medias audio/video/streams
FX player 2.9.3 : a video player with zoom feature
VNC Viewer 3.7.1 : the VNC viewer app (usefull with Termux and remote desktops)
YouCut - Video Editor 1.4 : cut videos and publish them
Comic Screen 2188 : an Ebook comics/manga reader
Google PDF Viewer 2.19 : the PDF viewer from google
Duplicate Contacts Remover 1.11 : remove duplicate contacts from your list
SFTP Server s0 v1 1.24 : a Secure FTP server to transfer files
DiskUsage 4.0.2 : storage space, how much space is used by folders and files.
Slider Widget 0.9.8 : some launcher widgets to control brightness etc
Rotation Control 1.0 : force rotation of the screen
Screen Master 1.7.0 : take screenshots
Droid Hardware Info 1.2 : informations about hardware (SoC CPU/GPU / sensors)
Bluetooth Devices Info 1.3.1 : informations about your bluetooth devices
Open Camera 1.48 : an open source app for photos and videos
arduinodroid 4.4.2 : the arduino development app / electronic/robotic
7Zipper 3.10 : the zip archiver, for compressed files, zip and other formats
GNURoot v0.1.5 : a linux terminal a bit like Termux (another option)
Termux 0.108 : a linux terminal for Android with many packages
Termux API 0.47 : control Android from shell scripts with termux-API (addon)
Termux Float 0.14 : floating termux terminal window (addon)
Termux Styling 0.29 : pimp up your termux app, with colors or fonts (addon)
AnLinux 6.17 : install a full linux distribution inside Termux

APK Export 3.2.4 : export .apk files from installed application
AIDE 3.2.20 : Android Integrated Development Environment to create applications for Android like Android Studio
Logcat Reader 1.7.2 : read system logs

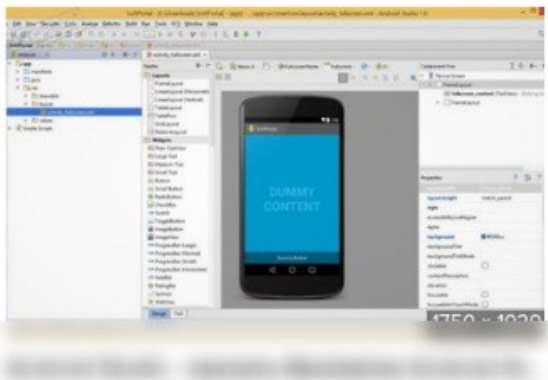
GAMES:
======
Droid-CPC 1.1.01 : Amstrad 8b computer emulator
NostalgiaNes 2.0.8 : Nintendo NES emulator
Free NES Emulator 2.3 : another NES emulator
FreeBox 2.1.21 : a DOS/FreeDOS emulator
Freedoom 0.4.2 : the freedoom game with many new levels (based on the doom game)
Frozen Bubble 4.7 : the bubble shooter game
GBCC : a game boy emulator
My OldBoy! Free 1.5.2 : another gameboy emulator
SEGA Emulator (Genesis) 2.0 : a Sega Megadrive/Genesis emulator
M64Plus FZ 3.0.290 : a nintendo64 emulator
Mahjong Solitaire Titan 2.5.5 : a mahjong game
MotoTron 1.4 : a tron game
TronXEGL : another full featured tron game
PokimonEradicator : a monster shooter game
OpenArena 0.8.8.41 : a 3D FPS shooter based on Quake 3 Arena
Snes9x EX+ 1.5.49 : a super nintendo emulator
UniPatcher 0.17.2 : a super nintendo ROM patcher (for modified / homebrew games)

31-Application development (Android Studio and AIDE)

Creating applications for Android,
Most famous/used tool to create Android apps is google's **'Android Studio'** but it requires a strong PC, it can emulate an android device, with different setup to make your app compatible here and there and have much possibilities
(It only works on PC)

The second option is **AIDE (Android Integrated Development Environment)** and you can install it directly on your Android tablet; it is a lightweight though complete Android development platform. **(you don't need a PC with it)**

(see pictures next page)



developer.android.com/studio - Android Studio (PC)

android-ide.com – AIDE Android Integrated Development Environment (Android)

developer.android.com/reference - Android A.P.I.

stackoverflow.com - Questions & answers

It is also possible to build Android apps manualy from a linux terminal with the toolchain. (shell / TERMUX / PROOT linux)

32-The Android-Linux hacker (Termux / PROOT / ADB)

On Android you will find **terminals** that you can install to **run text commands** or **scripts**, like on a **Linux box**, but usualy pretty limited.

One of theses terminal that is not so limited like the other ones, is called **Termux**, it is an Android terminal app, with ported text mode applications that you can install like you would on a standard **linux command line interface**.

You will find nano, grep, netcat, python, ruby, clang ... and so on, with a package management **'pkg'** like **'apt'** used in **Debian** or **Ubuntu**.

Note that Termux is **not a Linux emulator**, the console programs runs into the same native execution environment as the Android device OS and programs.

On top of Termux (inside Termux) you can install
a **'proot' GNU/Linux distribution**, that is a real Linux distribution, like Ubuntu or others, proot virtualise the filesystem and the linux system (so you can be root on a proot linux install..virtualised but not emulated).
Then you can install any packages including graphic Linux desktop apps like **TheGimp** or **LibreOffice**.
And again they are **not emulated**, so they run pretty well in the same exec-space.
The **X/Xorg graphic server** is virtualised tho, so you need to start it from the console, and **access it in loopback** with a **VNC client app** on the Android side.

Note: The **X server** cannot use hardware acceleration and OpenGL is not available (ARM mobile devices are based on OpenGL-ES btw which is different than OpenGL)
You need to use **tigervncserver** or **tightvncserver** to start the graphic VNC server inside Termux, and connect to it with the VNC client app like **127.0.0.1:5901**
Then with a mouse/keyboard you will feel exactly like on a real GNU/Linux computer box.

With a proot-linux-install on Termux you can have **gcc** and the **full linux toolchain** to **compile linux apps** like on real linux box.

Rooting an Android device:

Rooting an Android device, means that you get 'root' access, admin with low-level privileges and that you can change or modify anything on the Android system.
When a device is rooted, some applications may stop to function properly.
Rooting a device (trying to root it) is usualy not a good idea because of the risks to break the device ('bricking' it with a dead screen, or an unrecoverable boot loop with NO factory reset possible)

Anyway sometimes it can be a good idea,
ex: on a Lineage OS raspberry PI computer board
with no risk of bricking anything

Rooting involves few manipulations:

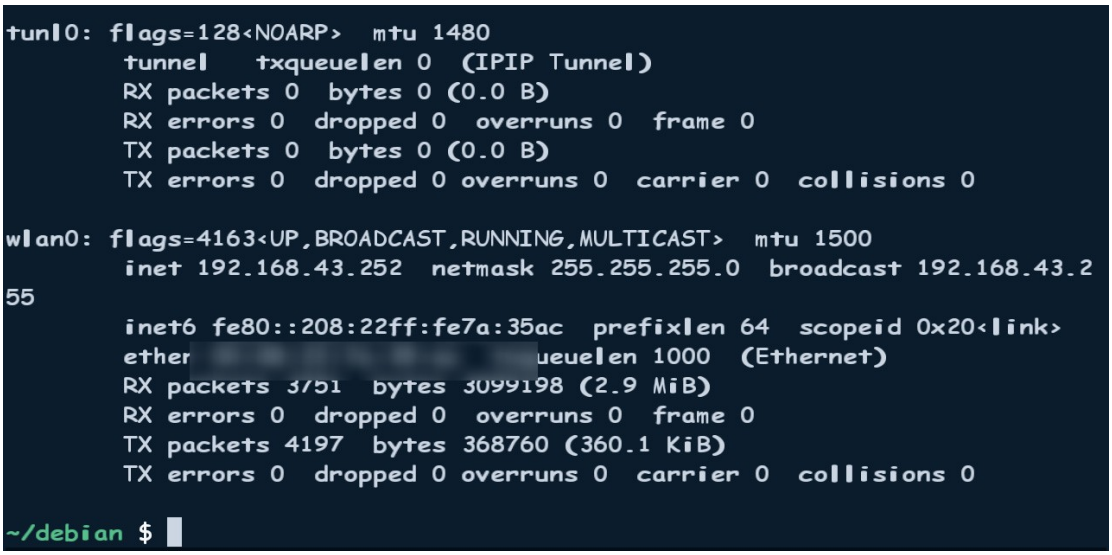
-Downloading an ISO/IMG of Android and/or suid/mods
(if flashing the OS itself with another version, or 'stock-ROM' to reset it)
and: 'suid-mod' / 'Magisk-mod' zip archives : that is the scripts/mods to access root privileges,
and eventually the possibility to hide it to the apps (Magisk).
and put theses onto the SD card.

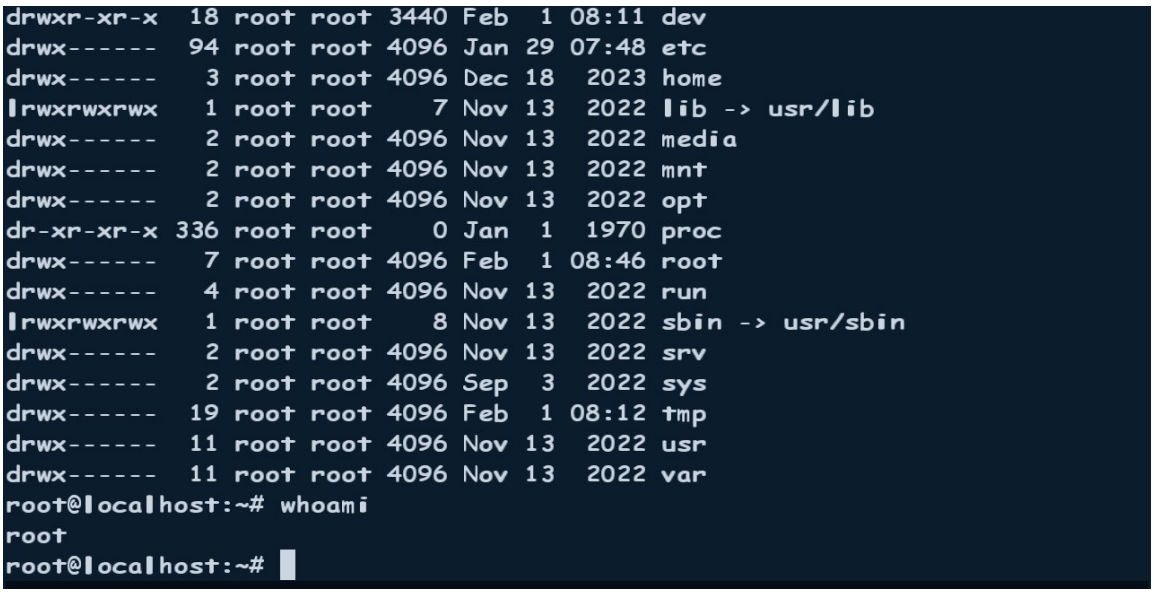
-Unlocking the bootloader with adb
(command line via a USB cable with a computer)

-flashing TWRP boot (TeamWinRecoveryProject) (via a USB cable from a computer)
(TWRP replace the first boot stage of the device)
-boot on TWRP with a special manipulation
(keeping power button pressed + volume for 2 seconds or things like that)
Ensure that you have enough battery before doing so
(flashing an entire ROM dump can take some time)

-do the modification from TWRP and reboot.

Note: adb is a command line tool part of the Google dev kit,
works on Windows or Linux, but the OS might need additional special drivers to correctly detect your phone to use adb (via a USB cable).





33-Keyboard shortcuts, screenshots, home key and more

(checkout "Hacker's Keyboard" app to change the Android virtual keyboard)
(if you want a complete layout with ctrl or alt keys etc)

Here is some of the most usefull keyboard shortcuts for
Android, and also for few Android apps,
note that some of theses shorcuts may differ depending of the version of
the system or apps.

the ‘Win’ key is the Windows key from PC computers, sometimes named differently
‘Mod’ or with a logo on it.

(with a physical keyboard connected, USB or bluetooth)

=== ANDROID ===

Home : back at the desktop screen, use TAB to navigate.
Win + N : Notification Panel (then use TAB and left/right/up/down to navigate)
Win + P : Open device Settings
Win + A : Add screen Widget
Win + S : Universal Search
Win + W : change wallpaper

Arrows keys(left/right/up/down) to select an icon then press Enter to start it
(note that in portrait mode it may not work, landscape/desktop mode)

Alt + Tab to select a background running program (switch between programs)
Esc to quit a program, or **Backspace** (<---) back to desktop screen
Alt + Tab THEN Del or Backspace to close a program in the list
Alt + Arrows in a browser for previous or next tab
OR **Ctrl + Tab** OR **Ctrl + Pagedown or Pageup** to switch tab
Tab key to switch to next form entry inside forms webpages or apps.
Ctrl + alt + '+' or '-' to zoom in or out in some programs (or without alt).
Win + spacebar to change keyboard language layout (multiple languages).

Use **TAB** or **Shift + TAB** to navigate forward and backward,
and/or **ARROWS** (directionnal).

NOTIFICATIONS: (example: bluetooth panel openning)
Press **Win + N**, then navigate with **tab/left/right, cursor keys** (bottom arrow) and press **return** to open the **control-icons panel**,

LANGUAGES / ACCENTS / EMOTICONS:

Keep **(right) ALT** pressed in a textfield for Android Accents/Emoticons (with Android Virtual Keyboard, check settings keyboard-language, don't work with Hacker's_Keyboard app) – access emoticons or accentuated letters).
click and longclick on E to display accentuated E letters or symbols
long press on numbers for math symbols, long press on $ for Yen, etc
Win + spacebar to switch between installed/configured keyboard languages (see settings, language keyboard)

Android: when screen is off, press Space bar, then enter your code to unlock the screen. (Space bar or Enter key)

==Web-Browser-Generic==

WARNING: some web browsers like firefox don't have working shortcuts. (use Chrome or ADblock browser or another)

Ctrl + L link(url)
Ctrl + O open
Ctrl + W or Ctrl + Q close, quit
Ctrl + F search/find
Ctrl + S save
Ctrl + C copy
Ctrl + V paste
Ctrl + X cut (or close)
Ctrl + Tab / Ctrl + Pagedown-Pageup next/previous tab

==Total-Commander== (File explorer)

1-pageup
2-rename
4-edit
5-copy
6-move
7-new folder
8-delete
9-sort list
0-page down
space-select file
+/--select dialog
*-reverse selection
ENTER-open file/folder
/ @-properties
ESC/BACKSPACE-up one level
Shift+8-select all files and folders

==TERMUX== (Android-Linux Terminal)

Ctrl + Alt + C : Start a new terminal
Ctrl + Alt + Up or Down : Switch between terminals
Ctrl + Alt + Left or Right : Display the hidden side menu (swipe from left)
Ctrl + Alt + Plus or Minus : Zoom in/out text font
(Long press on the terminal screen to select font/style or kill and options)

Theses ones depends of your keyboard, but usualy you will have shortcuts that can dim the display / volume or start the player, so checkout on your keyboard the function keys (FN), here is what it could look like:

ZIYOULANG – [Q] SANTA-KEYS : type faster than your shadwo ! ~ ~ ~

(Nearly all shortcuts or advanced keys works on Android 12 out of the box)
3 Devices at most (a 2.4Ghz with the USB dongle and 2 BT devices):

Fn + Q : SELECT 2.4 Ghz (dongle)
Fn + W : SELECT Bluetooth 1
Fn + E : SELECT Bluetooth 2
Fn + T : music player
Fn + Y : sound dec -
Fn + U : sound inc +
Fn + I : mute
Fn + O : player
Fn + P : previous song
Fn + { : play/pause
Fn + } : next song
Fn + Win : Lock
Fn + Esc : ` (back apostrophe)
Fn + Shift + Esc : ~ (tilde)
Fn + 1..9.0-+ (numkeys) : func keys
FX(F0..F12)
Fn + backspace : Pause/Break
Fn + home : PrintScreen (screencapture)
Fn + del : Insert
Fn + pgup : Scroll Lock
Fn + pgdn : End

If you press ‘F1’ (Fn+1) and just get locked into a white screen,
then press ‘F2’ (Fn+2) to exit it, back to home screen.
(it is supposed to be the help screen but may not display properly)

Provided to you by =RIPTor=, We been RIPPING DVDs…
and now we RIP Your MOMs’TECH!

34-More settings: the developers options

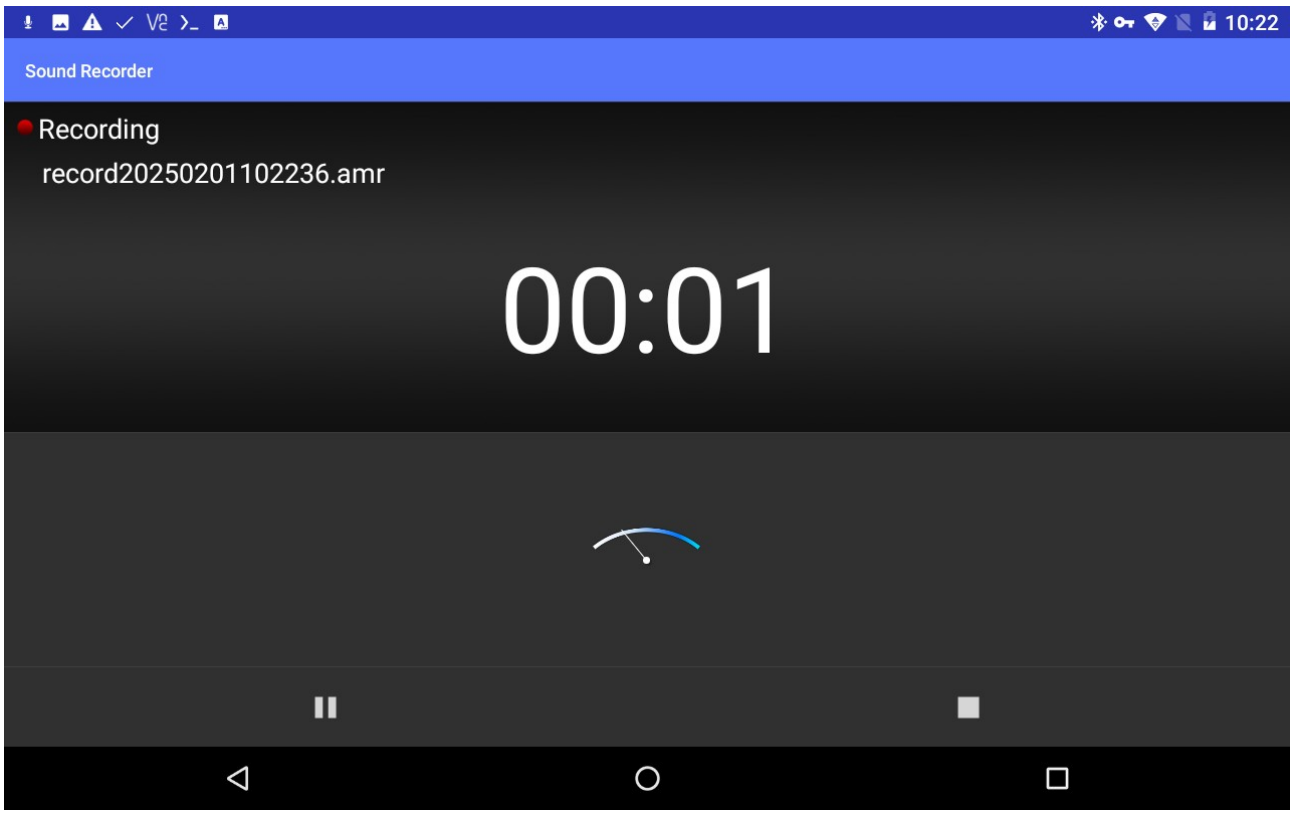
You can have more settings, or debug option if you enable the developer options. It will add a ‘developer option’ category in the settings, with more parameters, here is how to activate it:

-tap the settings gear icon
-tap 'About device' or 'About phone' (at the very end of the list usualy)
(-tap 'Software Information' if needed)
-tap 'Build number' 7 times (again at the end of the list)

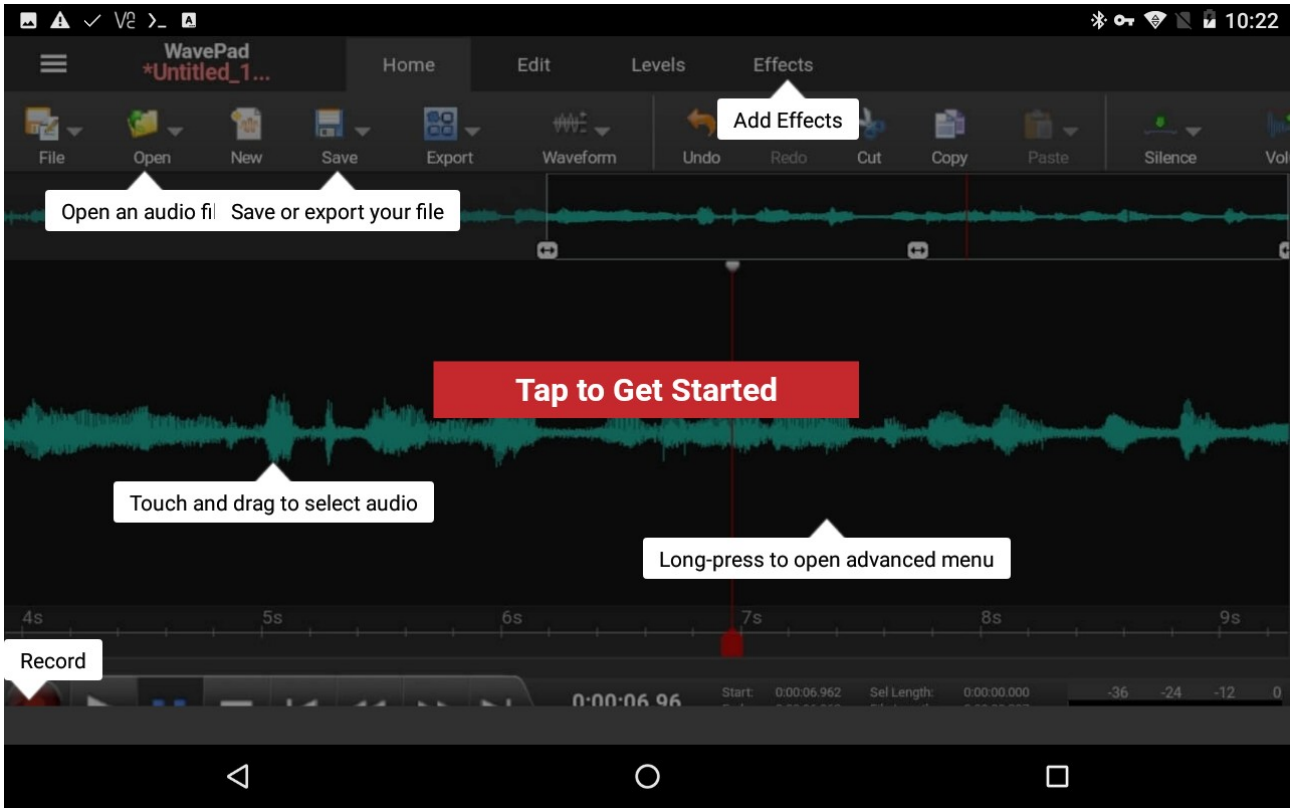
And now the 'Developer options' entry should be available
in the system settings with things that you can turn on or off
and configure.

35-Record your voice like Elvis

Android usualy comes with a **sound recorder** out of the box, **'record'** with a **red dot icon** or a **microphone**, so you can record memos like Dona Skooly or your cat mowling, and with another app like **Wavepad** or others (from the store) you can add echos to it or other effects, or use it as a sample. When you record a song, the output file will usualy be found in the **"Recording/"** folder or the **"Music/"** folder.
There are also **Drumbox apps** or **virtual synthetisers** with the touchscreens as keys.
(see pictures next page)



Default sound recorder with integrated microphone



Wavepad, an app to modify your audio files

36-Draw like a manga-maker star

By default there is no **drawing app** usualy, but you can easily install one, like **'Infinite design'**, you can draw with you finger with different pencil style, and templates that can look very fashionable. And zoom in/out very easily with the 2 fingers pinch gesture or load a picture and modify it, or draw over it.
Another app is **"Photo editor"** to change brightness contrast or add a blur effect or text bubbles and crop pictures etc, there is also a 'draw' mode in it, or use geometric forms, circle/square/stars and even emoticons smileys or fun cartoon like things. Then put a picture into another picture or part of it.

You can also use a mouse of course, and there are **'optical pens'**:
That is a **lazer pen** that works on any surface, and it can be wireless USB (2.4Ghz) that you connect with an OTG adapter or eventually bluetooth ones.
A bit like a drawing tablet, feels like a real pen and very precise.

Infinite Design, a drawing app with 2 finger gesture zoom and templates and more

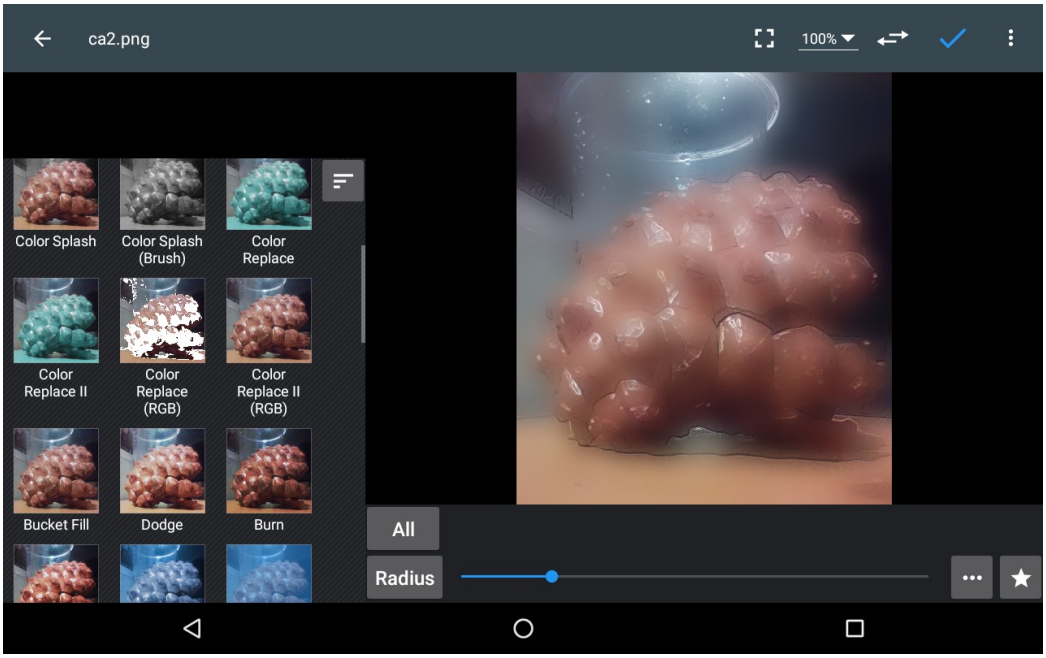


Photo Editor, a photo editor app with many filters and image manipulation

37-More Android things

Android as :

a drawing tablet onscreen or with a wireless pen

an home jukebox and radio (integrated FM or streamed)

an alarm device (remote monitoring)

a control device for a drone-toy, model car or neon lighting

a robot arduino thing...(electronic hacking arduino droid)

38-Limitations

No admin/root, to guarantee app developers and others, security of the system.
no cheaters and no messing with internal app states
(cache private data and so on)
(no messing with the system itself either, see 'rooting')

Cannot repair SDcard or USB stick or disc.

No low-level access,
if you want to try to recover/repair a broken SD/USB, you need a PC,
or root access with Lineage OS or something else.

same if you want to format a USB stick in another format than the Android one,
or if you want to **make a linux USB boot stick**.

39-Issues (bugs or other problems)

Factory reset in case of issue:

The manipulation depends of the device, keep 2 buttons pressed at boot time
WARNING everything can be in chinese or korean sometimes,
and when doing a factory reset **EVERYTHING WILL BE ERASED ON THE DEVICE.**
(try to save your data first and remove the SD card)

look online for more information about your device’s factory reset

Unsupported hardware or bug? Forum and chat community You can check on the official Android site, report/track bugs on github and others, Another good resource site for troubleshooting things is stackoverflow, though it is more oriented towards developers, see the links below.

40-Links (list of related online links)

https://www.android.com : Android | Do More With Google on Android Phones & Devices

https://play.google.com : Google - Apps on Google Play (the playstore)

https://m.apkpure.com : Download APK on Android with Free Online APK Downloader – APKPure (.apk applications repository)

https://www.apkmirror.com : APKMirror - Free APK Downloads - Free and safe Android APK downloads (.apk application repository)

https://f-droid.org : F-Droid - Free and Open Source Android App Repository

https://archive.org : Internet Archive: Digital Library of Free & Borrowable Texts, Movies ...

https://www.frandroid.org : Frandroid - La référence tech pour s'informer, comparer et bien acheter

https://developer.android.com/reference : Android API reference - Android Developers

https://developer.android.com/studio : Download Android Studio & App Tools - Android Developers

https://www.android-ide.com : AIDE - Android IDE (create apps for Android without PC)

https://forum.arduino.cc : Welcome ArduinoDroid - Arduino IDE for Android (electronic hobbist board)

https://www.kernel.org : The Linux Kernel Archives, The linux kernel, used in GNU/Linux distributions and Android operating system

https://www.ubuntu.com/download : Download - Get Ubuntu, Famous GNU/Linux distribution

https://oldversion.com : OldVersion.com, Old versions of programs for different operating systems

https://stackoverflow.com : Stack Overflow - Where Developers Learn, Share, & Build Careers, Developers' forum and resources

https://lineageos.org : LineageOS - LineageOS Android Distribution, The LineageOS operating system based on Android

https://konstakang.com : KonstaKANG.com LineageOS for various devices including Raspberry PI

https://termux.dev/en : Termux | The main termux site and help pages.

https://github.com/termux/termux-app/releases : Termux

https://raspberrypi.com : Raspberry Pi (Broadcom tiny computer boards) (Android, Linux, and more)

https://aliexpress.com : ?AliExpress? officiel | AliExpress.com, all sort of electronic goods including Android hardware cables and adapters

https://m.banggood.com : Banggood® Official Website | Global Leading Online Shop, all sort of electronic goods including Android hardware cables and adapters

https://sourceforge.net : Compare, Download & Develop Open Source & Business Software – SourceForge

https://github.com : GitHub · Build and ship software on a single, collaborative platform (programming source code)

https://gitlab.com : GitLab DevOps Platform | One Platform, One Team (programming source code)

https://hackaday.com : Hackaday | Fresh Hacks Every Day (hacking)

https://imgur.com : Imgur: The magic of the Internet (paste picture online)

https://paste.pics : paste.pics - Online Screenshots, service for getting links to pictures … (paste pictures online)

https://pastebin.com : Pastebin.com - #1 paste tool since 2002! (paste text online)

https://tomshardware.com : Tom's Hardware: For The Hardcore PC Enthusiast

https://www.androidauthority.com : Android Authority: Tech Reviews, News, Buyer's Guides, Deals, How-To

https://www.androidcentral.com : Android Central - News, Reviews, Deals & Help on all Android devices

https://techcrunch.com : TechCrunch | Startup and Technology News

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